

# SUCKING LICE OF VENEZUELAN RODENTS, WITH REMARKS ON RELATED SPECIES (ANOPLURA)

by

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## ABSTRACT

The paper includes discussions and descriptions of species of Anoplura known to occur on Venezuelan rodents, and of certain other taxa related to Venezuelan forms. Five genera are represented: *Enderleinellus* Fahrenholz—2 species; *insularis* Werneck and *venezuelae* Ferris; *Hoplopleura* Enderlein—19 species, 11 of them new: *sciuricola* Ferris; *arizonensis* Stojanovich and Pratt; *aitkeni*, new species; *travassosi* Werneck; *abehi*, new species; *rimae*, new species; *angulata* Ferris; *indiscreta*, new species; *tiptoni*, new species; *handleyi*, new species; *eximia*, new species; *quadridentata* (Neumann); *contigua*, new species; *nesoryzomydis* Ferris; *oryzomydis* Pratt and Lane; *multilobata* Werneck; *splendida*, new

species; *inuitata*, new species; and *orinocoi*, new species; *Fahrenholzia* Kellogg and Ferris—1 species; *schwartzi* Werneck; *Neohaematopinus* Mjöberg—1 species; *semifasciatus* Ferris, *sensu lato*; and *Polypax* Enderlein—1 species; *spinulosa* (Burmeister), which is found on introduced *Rattus* species. Keys to the genera and to the species of *Hoplopleura* are included. *Hoplopleura* is the most characteristic genus of Anoplura in South America, and there are several marked species groups within the genus. One of the groups was placed by Ewing (1923) in the genus *Pterophthirus*, which is considered a synonym of *Hoplopleura* Enderlein in this paper.

## INTRODUCTION

The major portion of material reported on in this paper came from the cooperative Smithsonian-U.S. Army survey of Venezuelan mammals and their ectoparasites (Smithsonian Venezuela Project) that was directed by Dr. Charles O. Handley, Jr., U.S. National Museum of Natural History, and Dr. Vernon J. Tipton, now of Brigham Young University. The survey was begun in July 1965 and field phases terminated in June 1968. During this period, all ecological and geographical areas of the country were intensely and scrupulously sampled. Because of the intensity and breadth of the survey, we now have a comprehensive insight into the host specificity of all the more common species of rodent-infesting Anoplura found in Venezuela. Study of the collections of rodent-infesting Anoplura from neighboring Trinidad, and from northeastern Brazil, made by Dr. T. H. G. Aitken of the Rocketteller Foundation, offered valuable supporting data. Also utilized during preparation of this study was a collection of Ano-

plura obtained during the Uruguay Expedition of the Department of Mammalogy, American Museum of Natural History, under a grant from the U.S. Army Medical Research and Development Command (No. DA-MD-49-193-63-G82), December 1962-May 1963. The author also examined various specimens of Nearctic and Neotropical sucking lice from the collections of the British Museum (Natural History), Field Museum of Natural History, U. S. National Museum of Natural History, and Division of Entomology, University of California, Berkeley (the Ferris Collection).

Holotypes of the new species described in this paper are deposited in the collections of the United States National Museum.

Most of the morphological terms used herein are ones traditionally employed for description of aspects of anopluran morphology. I have drawn on the papers of Kim (1965, 1966a, b) for certain terminologies of the setae of the dorsum of the head and follow Kim in using

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the term "genital seta" for the modified apical seta found on each of the pair of genital lobes or "gonopods" of the ninth segment of the female. I follow Ferris (1951:120) in regarding the first tergal abdominal plate, when present, as being that of the first abdominal segment (see the *travassosi*-group species of *Hoplopleura*, numbers 1-12). The shape of the abdominal setae often affords an excellent taxonomic character in the genus *Hoplopleura*. "Sword-shaped" setae are as in Fig. 24b; "inflated" setae are as in Fig. 24a; and "straight" setae are like that of Fig. 24a, but not medially broadened. In the female, the "genital plate" consists of the last sternal plate of segment 7 and the single sternal plate of segment 8. These plates may be coalesced or separate.

All the setae present on the legs and antennae have not been drawn in on the illustrations, but all setae of the head will be found on the enlarged drawings of this part, and all abdominal setae are present in the appropriate figures. In drawings of whole lice, heads, aedeagi, and thoracic sternal plates, the two lateral outlines of the longitudinal halves are as in the actual specimen. The "mirror-image" illustrative technique, though possibly satisfying aesthetically, can lead to improper emphasis of curves, protuberances, etc. Corresponding parts,

on a single plate, are drawn to the same scale.

The numerous members of the genera *Hoplopleura* Enderlein and *Polyplax* Enderlein are the most characteristic anopluran parasites of the order Rodentia. While *Hoplopleura* appears to be the most important element of the South American anopluran fauna (the radiation in this group has been intense), *Polyplax* is represented on this continent only by *Polyplax spinulosa* (Burmeister), which is a parasite of introduced *Rattus* species.

Several of the species of *Hoplopleura* discussed and illustrated here are not present in Venezuela. They were included because of their relationship to Venezuelan species or species groups. All the anopluran species known to occur in Venezuela are identified by a star following the species name as it occurs as a heading. Individual hosts are identified by the SVP field number. In the case of material from the American Museum of Natural History and the U.S. National Museum, the collection number refers to the museum catalog number.

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## TAXONOMY

### Key to the Genera of Rodent-Inesting Anoplura of Venezuela

1. Anterior and middle legs of same size and form, both small and slender, posterior pair much larger; venter of abdomen with a pair of small, widely separated, sclerotized detached plates on segment 3 *Enderleinellus* Fahrenholz  
 Anterior legs the smallest of the three pairs, the second pair at least somewhat larger than the first and with a stouter claw; venter of abdominal segment 2 without a pair of detached plates 2
2. Middle and posterior pairs of legs large, subequal in size, first pair much smaller; paratergal plate II (of second abdominal segment) divided into two large, broadly separated sclerites, one lying on the venter, the other on the dorsum; paratergal plates absent on abdominal segments 5-8 in the Venezuelan species *Fahrenholzia* Kellogg and Ferris  
 Third pair of legs larger than second; if paratergal plate II is divided, the parts are contiguous; paratergal plates present on abdominal segments 2-8 3
3. Paratergal plates of segment 2 divided into two contiguous but separate parts, the dorsal one small and lacking setae; sternal plate of abdominal segment 2 extended laterally to approximate or articulate with the corresponding paratergal plate *Hoplopleura* Enderlein  
 Paratergal plates of segment 2 not so divided, though the center may be only lightly sclerotized; sternal plate of this segment not extended laterally 4

4. No indication of division of paratergal plate II; tarsal claw of first leg apically bifid in Venezuelan species; male with second tergal plate of abdominal segment 2 posteriorly emarginate and bearing a group of radially arranged setae at each end .....

*Neohaematopinus* Mjöberg

- With an indication of division of paratergal plate II (i.e., with the center membranous); tarsal claw of first leg not apically bifid; second tergal plate of abdominal segment 2 of male not modified .....

*Polyplax* Enderlein

### Genus *Enderleinellus* Fahrenholz

*Enderleinellus* Fahrenholz, 1912:56. — Ferris, 1919:7.—Werneck, 1948a:281.—Ferris, 1951:102.—Johnson, 1960:7.—Kim, 1966a:991.

Type Species: *Pediculus sphaerocephalus* Nitzsch (preocc.), orig. design. = *Enderleinellus nitzschii* Fahrenholz (*nomina nuda*).

Full synonymies and extensive discussions of *Enderleinellus* may be found in the papers listed above. All known species of this genus occur on members of the Sciuridae. Two species are known from Venezuela; one of these, *insularis* Werneck, was not collected during the present survey.

#### 1. *Enderleinellus insularis* Werneck°

*Enderleinellus extremus* Ferris, 1919:24 (*partim*, records from *Sciurus nesaes*).

*Enderleinellus insularis* Werneck, 1948a:293, Fig. 25-27. — Hopkins, 1949:457. — Ferris, 1951:105, 109.—Kim, 1966a:1018, Fig. 23, 40, 129-133.

The male holotype and 3 female and 3 male paratypes were taken from *Sciurus nesaes* (now regarded as *Sciurus granatensis nesaes*), FCM 16608, Venezuela: Margarita Island. It has not been recollected.

#### DIAGNOSIS

This species may be distinguished from *E. venezuelae* Ferris by characters given under that species.

#### 2. *Enderleinellus venezuelae* Ferris°

(Fig. 1)

*Enderleinellus venezuelae* Ferris, 1919:25, Fig. 13.—Werneck, 1948a:292, Fig. 22-24.—Hopkins, 1949:457.—Ferris, 1951:106, 114.—Kim, 1966a:1017, Fig. 22, 39, 125-128.

The types were from *Sciurus granatensis* (as *S. griseogena*), Venezuela: Macuto. Ferris also recorded *venezuelae* from *Sciurus granatensis* (as *S. gerrardi*) in Venezuela. The specimens listed here are the first since the original description.

### VENEZUELAN RECORDS

Two females, 1 male, 1 nymph ex *Sciurus granatensis* (SVP 32249), Carabobo, 4 km NNW Montalbán, El California, 7-XI-67, Tuttle team collectors; 2 females, 3 males, 1 nymph (SVP 34256, 34263, 34265), same host and data but 7-I-68; 6 females, 4 males, 5 nymphs (SVP 34089), same host and data but 2-I-68.

#### DIAGNOSIS

*E. venezuelae* can be distinguished from the other known Venezuelan species, *insularis* Werneck, in the female by its having the spermatheca oval rather than tubular, and in the male by its having the arms of the basal plate with a deeply U-shaped emargination rather than a very shallow one.

#### DISCUSSION

The specimens collected during this survey are similar to the type series. Probably all the nymphs are of the second and/or third instar, judging from the description and figures of *Enderleinellus* nymphs in Kim (1966a, b). They have 4 functional abdominal spiracles (Fig. 1), the first 2 being associated with paratergal plates that bear 2 short apical setae each. Each of the typical abdominal segments bears 2 median setae both dorsally and ventrally.

*E. venezuelae* occurred together with *Hoplopleura sciuricola* Ferris in two collections and with both *H. sciuricola* and *Neohaematopinus semifasciatus* Ferris in two collections.

### Genus *Hoplopleura* Enderlein

*Hoplopleura* Enderlein, 1904:221. — Ferris, 1921:59.

*Pterophthirus* Ewing, 1923:147 (type species: *Hoplopleura alata* Ferris). New Synonymy: Ferris, 1932:280.—Ferris, 1951:144.

*Hoplopleura* Ferris, 1951:125. — Johnson, 1964:71.

Type Species: *Pediculus acanthopus* Burmeister (orig. design.).

Complete synonymical listings and descriptions may be found in Ferris (1921, 1951) and a revised description in Johnson (1964). *Hoplopleura* is the characteristic anopluran genus in South America. Not only do many typical species occur there, but also several very aberrant forms.

Ewing (1923) named the genus *Pterophthirus* to include *Hoplopleura alata* Ferris and *H. audax* Ferris. At the time it was described, *Pterophthirus* could be separated from *Hoplopleura* on the basis of the second paratergal plates being greatly elongate and because the first sternal plate of the third abdominal segment lacked modified apical setae. Several years after Ewing established the name, two more species were described as members of *Pterophthirus*: *imitans* Werneck, 1942 and *wernecki* Guimarães, 1950. Both Guimarães (1950) and Ferris (1951) pointed out that in some respects *imitans* and *wernecki* were transitional between *alata-audax* and typical members of the genus *Hoplopleura*. In both *imitans* and *wernecki* the dorsoapical lobe of paratergal plate II is prolonged, especially in *wernecki*; and, as with *alata* and *audax*, paratergal plate II has an apical membranous connection to the dorsum of the abdomen. However, the first sternal plate of the third abdominal segment does not approach the corresponding paratergal plate, and the paratergal plates are lateral in position rather than being almost entirely on the dorsal surface. Thus, as *imitans* and *wernecki* depart from typical *Hoplopleura* species in lacking the modi-

fied sternal plate of the third abdominal segment, they also depart from *alata-audax* in this regard, and approach typical *Hoplopleura* species by having paratergite II much less modified than in *alata-audax*, and by having the paratergal plates wrap around the lateral margin of the abdomen rather than being almost completely dorsal. Other species currently placed in the genus *Hoplopleura* lack the typically modified sternal plate of abdominal segment III: *disgrega* Ferris and *chilensis* Werneck from South America, and *bidentata* (Neumann), *diaphora* Johnson, *gyomydis* Kuhn and Ludwig, and *emarginata* Ferris from the Old World and Australia. All of these species, as well as *alata*-related forms, are like typical *Hoplopleura* in their having the second abdominal sternal plate articulate with the corresponding paratergal plate, and in the general facies of the head, form and positioning of abdominal setae, etc. Because the species listed above lack other consistent characters, it seems preferable to leave all the species in the genus *Hoplopleura*, suppressing the name *Pterophthirus* Ewing. Further discussion of the relationships of the South American species will be found later in this paper.

#### Key to Adults of Venezuelan Species of *Hoplopleura*

1. Paratergal plate II with a long winglike dorsoapical process that bears 2 thornlike setae medially (Fig. 168); from *Proechimys* ..... 22. *splendida*, new species  
Dorsal lobe of paratergal plate II not prolonged, never longer than plate proper (Fig. 6) ..... 2
2. Paratergal plate III with both dorsal and ventral lobes apically acute (Fig. 6, 9, 213, 214) ..... 3  
Paratergal plate III with truncate or rounded apical lobes, these sometimes subdivided (Fig. 40, 89, 107) ..... 7
3. First sternal plate of abdominal segment III not extended laterally to approach corresponding paratergal plate (Fig. 206); thoracic sternal plate poorly sclerotized, lateral margins ill defined (Fig. 215, 216) ..... 4  
First sternal plate of abdominal segment III extended laterally (Fig. 19); thoracic sternal plate well sclerotized (Fig. 17) ..... 5
4. Dorsum of head with accessory seta as long as principal one, postantennal area very broad, postantennal angles rounded (Fig. 211); from *Mesomys* ..... 26. *orinocoli*, new species  
Dorsum of head with accessory seta shorter than principal dorsal seta, postantennal area not especially broad, postantennal angles not rounded (Fig. 208); from *Echimy* ..... 25. *inusitata*, new species
5. Paratergal plates IV-V with both apical lobes quadrate (Fig. 9); male with one row of setae and one plate dorsally on each typical abdominal segment; from *Akodon urichi* ..... 3. *aitkeni*, new species  
Paratergal plates IV-V with both apical lobes acute (Fig. 6); male with two plates and rows of setae dorsally on each typical abdominal segment ..... 6
6. Abdomen laterally with numerous medially inflated setae, shorter than those on the sternal and tergal plates; aedeagus with lateral apical arms of pseudopenis narrow and laterally serrate; from *Sciurus* ..... 1. *sciuricola* Ferris



- Lateral setae of abdomen sword shaped, not strongly inflated medially, and as long as those on sternal and tergal plates; pseudopenis of aedeagus with broad, nonseriate arms (Fig. 8); from *Sigmodon* ..... 2. *arizonensis* Stojanovich and Pratt
7. First antennal segment greatly enlarged (Fig. 145); paratergal plates IV-VI with dorsal apical seta (both apical setae minute) removed from margin to dorsal surface (Fig. 143); from *Oryzomys albigularis* ..... 17. *multilobata* Werneck
- First antennal segment not so enlarged (Fig. 49, 61, 80); paratergal plates IV-VI with 1 or 2 apical setae, but never with 1 removed from margin (Fig. 40, 42, 107) .... 8
8. Thoracic sternal plate posteroapically acute or narrowly rounded, the apex bearing a longitudinal mesal thickening or keel (Fig. 30); apical lobes of paratergal plate III quadrate, not subdivided (Fig. 40, 72, 89); *travassosi* group ..... 9
- Thoracic sternal plate posteroapically blunt or broadly rounded, lacking mesal sclerotization (Fig. 105, 125, 127); each of the apical lobes of paratergal plate III strongly subdivided into 2 lobules (Fig. 107, 120); *quadridentata* group ..... 16
9. Paratergal plate VII with 2 apical lobes and plate VIII with 1 apical lobe (Fig. 89); from *Neacomys* ..... 10. *handleyi*, new species
- Paratergal plate VII with no more than 1 apical lobe, and plate VIII always lacking lobes (Fig. 40, 60) ..... 10
10. Paratergal plate VII lacking apical lobes; plate III with 2 apical setae (Fig. 60, 82) ..... 11
- Paratergal plate III with 1 or 2 apical setae; plate VII with 1 apical lobe, rarely male has one or both plates lacking the lobe, but in this case plate III has but 1 apical seta ..... 12
11. Postantennal angles strongly extended and angulate (Fig. 61); 1 apical seta of paratergal plate III obviously longer than apical lobes, and other much shorter (Fig. 60); pseudopenis of aedeagus flared laterally and serrate (Fig. 62); from *Rhipidomys* ..... 7. *angulata* Ferris
- Postantennal angles not strongly extended (Fig. 80); apical setae of plate III about same size; pseudopenis not flared or strongly serrate ..... 13
12. Posterior margins of apical lobes of paratergal plates III-V oblique, bay between them noticeably broader apically than basally (Fig. 99); from *Anotomys* ..... 12. *eximia*, new species
- Apical lobes of paratergal plates III-V not oblique, bay between them not much broader apically than basally (Fig. 82); from *Thomasomys laniger* ..... 9. *tiptoni*, new species
13. Paratergal plates III-IV each with 1 short apical seta (Fig. 42); aedeagus with pseudopenis strongly flared medially and grossly serrate laterally (Fig. 37); from *Oryzomys fulvescens* ..... 4. *travassosi* Werneck
- Paratergal plates III-IV both with 2 apical setae (Fig. 40, 72); pseudopenis may be strongly flared; if so, serrations are fine (Fig. 35, 36) ..... 14
14. Tergal plate of first abdominal segment (most anterior of the abdominal tergal plates) with fimbriate posterior margin (Fig. 57a); from *Oryzomys minutus* ..... 6. *rimae*, new species
- Tergal plate of first abdominal segment not posteriorly fimbriate (Fig. 57b, c, 70, 71) .. 15
15. Postantennal angles somewhat extended and angulate; posteroventral head margins posteriorly convergent (Fig. 74); no setae laterally off abdominal plates (Fig. 70, 71); male with but 1 long apical seta on paratergal plate VII (Fig. 71); from *Thomasomys lugens* ..... 8. *indiscreta*, new species
- Postantennal angles not at all extended; posterolateral head margins parallel (Fig. 49); ventrally, abdomen with setae laterally off plates (Fig. 45, 46); male with 2 long apical setae on paratergal plate VII; from *Akodon bogotensis* ..... 5. *abeli*, new species
16. Paratergal plate VII with 2 apical lobes; all paratergal plates reticulate and scaly (Fig. 107); from *Nectomys squamipes* ..... 13. *quadridentata* (Neumann)

- Plate VII with but 1 apical lobe; plates not particularly reticulate or scaly (Fig. 110, 120, 131) ..... 17
17. Paratergal plates II-III each with 2 long apical setae, both extending beyond apices of corresponding lobes (Fig. 110); from *Holochilus brasiliensis* 14. *contigua*, new species
- Paratergal plates II-III each with 1 long and 1 minute apical setae (minute seta may be missing on plate II) (Fig. 120, 131) ..... 18
18. Paratergal plate VI with both apical lobes subdivided into equal lobules (Fig. 131); only Venezuelan collection was taken from *Nectomys squamipes* ..... 16. *oryzomydis* Pratt and Lane
- Plate VI with only the dorsal apical lobe subdivided, and often this division only indicated (Fig. 120); from *Zygodontomys* ..... 15. *nesoryzomydis* Ferris

### 1. *Hoplopleura sciuricola* Ferris<sup>o</sup>

*Hoplopleura sciuricola* Ferris, 1921:110, Fig. 69, 70. — Hopkins, 1949:455-458. — Ferris, 1951:129, 143.—Cook and Beer, 1959:411, Fig. 13, 24, 29.

The type series was from *Sciurus carolinensis*, USA: Mississippi. This member of the *erratica* group has been recorded by Ferris (1921) and Hopkins (1949) from several other species of North American *Sciurus*, belonging to different subgenera, and in South America from *Sciurus* species from Venezuela, Colombia, Peru, and Bolivia.

#### VENEZUELAN RECORDS

This species was taken in 27 collections (64 females, 48 males, and 14 nymphs) in various localities in Carabobo, Barinas, and Apure from *Sciurus granatensis*. There was a single collection of 2 females ex *Sciurus igniventris* (SVP 16802), from T. F. Amazonas, Boca Mavaca.

#### DISCUSSION

The present Venezuelan specimens are essentially like North American specimens except that there are only 1 or 2, rather than 4-6, small setae above the mesothoracic spiracle in the adult, and the nymph has fewer abdominal setae. Also, the first instar of Venezuelan *sciuricola* may have either 1 or 2 terminal abdominal setae on each side.

Two of the collections from *S. granatensis* also contained specimens of *Enderleinellus venezuelae* Ferris, and two contained *E. venezuelae* and *Neohaematopinus semifasciatus* Ferris, as well.

### 2. *Hoplopleura arizonensis* Stojanovich and Pratt<sup>o</sup> (Fig. 3, 6, 8)

*Hoplopleura hirsuta* Ferris, 1921:117 (*partim*, records from Arizona).

*Hoplopleura arizonensis* Stojanovich and Pratt, 1961a:313, Pl. II.

The male holotype and a series of male and female paratypes were taken from *Sigmodon* sp., USA: Arizona, Pinal County.

#### VENEZUELAN RECORDS

*H. arizonensis* is the typical anophuran parasite of Venezuelan *Sigmodon hispidus*. There were 15 females, 3 males, and 25 nymphs, in 17 collections, from various localities in Lara. One collection of 3 females ex *Oryzomys albicularis* (SVP 666), Dto. Federal, probably represents straggling or mechanical contamination.

#### DIAGNOSIS

*H. arizonensis* is a member of the *erratica* group and is closely related to *H. hirsuta* Ferris, which also occurs on *Sigmodon hispidus*. Male *arizonensis* can be separated from *hirsuta* by having 2 tergal plates per typical abdominal segment rather than 1, a rare occurrence in the genus *Hoplopleura*. As well, the male genitalia differ in the two species. In *arizonensis* the arms of the pseudopenis are heavy and of uneven thickness (Fig. 8) while in *hirsuta* the arms are narrow and of even width (Fig. 7). In both sexes of *arizonensis*, the preantennal region of the head is narrower than in *hirsuta*, with the mouthparts extending anteriorly (Fig. 3, 4). Unlike the type series of *arizonensis*, the paratergal plates of Venezuelan specimens are not measurably different from those of *hirsuta* (compare Fig. 5 and 6). Nymphs of *arizonensis* and *hirsuta* are similar except that those of *arizonensis* have the anterior head margin prolonged as in the adult.

#### DISCUSSION

The type of *hirsuta* was from North Carolina, and Ferris (1921) recorded *hirsuta* from various species of *Sigmodon* from Mexico, Venezuela, and Peru. His specimens from Arizona are *arizonensis* (*vide* Stojanovich and Pratt, 1961). Wenzel and Johnson (1966) recorded *hirsuta* from Panamanian *S. hispidus*. I have not seen Ferris's Venezuelan and Peruvian specimens, but one or both may be *arizonensis*, not *hirsuta*. Although these two closely related spe-

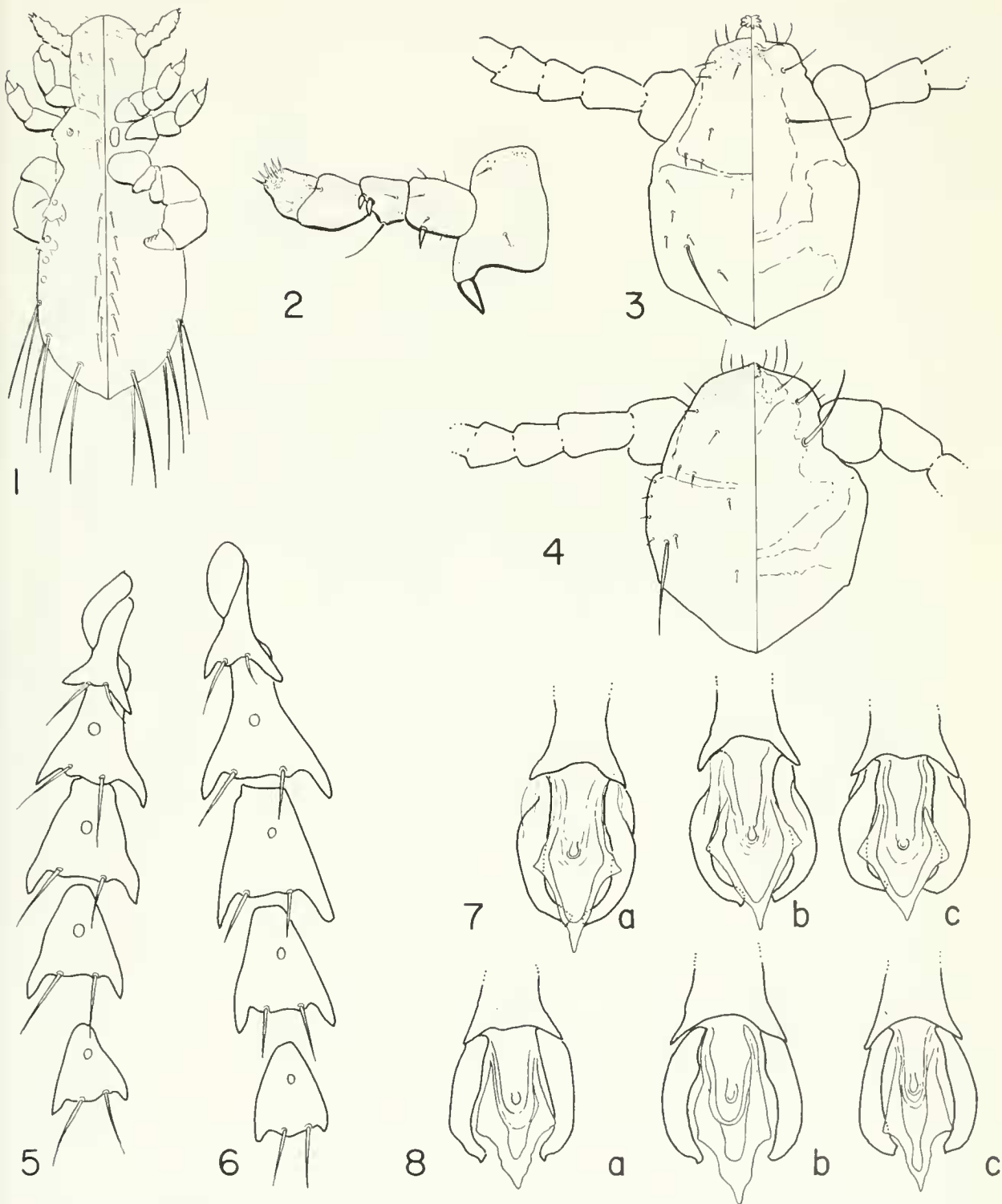


Fig. 1-8. 1, *Enderleinellus venezuelae* Ferris, nymph, second or third instar, ex *Sciurus granatensis* (SVP 34089); 2 *Neohaematopinus semifasciatus* Ferris, antenna, male, ex *S. granatensis* (SVP 33274); 3, *Hoplopleura arizonensis* Stojanovich and Pratt, head, male, ex *Oryzomys albigularis* (SVP 666); 4, *H. hirsuta* Ferris, head, male, Canal Zone, ex *Sigmodon hispidus*, 40065; 5, *H. hirsuta*, paratergal plates II-VI, female, Canal Zone, ex *S. hispidus*, 43287; 6, *H. arizonensis*, paratergal plates II-VI, female, ex *S. hispidus* (SVP 44757). Aedeagus: 7, *H. hirsuta*, ex *S. hispidus* (a, b, Canal Zone; c, Mississippi); 8 *H. arizonensis*, (a, Arizona ex *S. hispidus*; b, ex *Sigmodon hispidus* [SVP 44515]; c, ex *O. albigularis* [SVP 666].

cies of Anoplura occur on a single host species, it is not unlikely that they are allopatric. A study of the distribution of *hirsuta* and *arizonensis* would be of great interest.

### 3. *Hoplopleura aitkeni*, new species°

(Fig. 9-13, 17a-c, 18a, b, 19-22, 24a, 25)

**TYPE DATA:** Male holotype, female allotype, 10 female, 3 male paratypes ex *Akodon urichi* (SVP 14322), Venezuela; Sucre, 26 km ESE Carúpano, Manacal, 425 m elev., 19-VII-67, Peterson team collectors; 1 female, 1 male paratypes (SVP 14636), as above but near Manacal, 190 m elev., 1-VIII-67. A series of paratypes, all ex *Akodon urichi*, Venezuela, as follows: 1 female (SVP 651), Dto. Federal, 5 km NNE Caracas, 2223 m elev., 19-VIII-65, Peterson and Tuttle collectors; 1 male (SVP 692), as above but 2230 m elev., 22-VIII-65; 2 females, 1 male (SVP 740), as above but 2232 m elev., 23-VIII-65; 1 male (SVP 1072), as above but 2135 m elev., 5-IX-65; 1 female, 2 males (SVP 13069), Dto. Federal, 29 km SW Caracas, 2025 m elev., 25-V-67, Peterson team collectors; 1 female (SVP 14760), Miranda, 15 km SW Caracas, IVIC, 1580 m elev., 19-X-67, Peterson team collectors; 1 female, 2 males (SVP 31929), Carabobo, 4.5 km SE Montalbán, Savannah Aguirre, 1055 m elev., 2-XI-67, Tuttle team collectors; 2 females, 1 male (SVP 32373), as above but Montalbán, Potosí, 1091 m elev., 9-XI-67; 4 females, 4 males (SVP 32459), as above but 10-XI-67; 3 males (SVP 32337), as above but 8-XI-67. 3 additional males, not paratypes, (SVP 32337).

### DIAGNOSIS

A member of the *hesperomydis-affinis* group. Closely related to *H. affinis* (Burmeister, 1839). Differs from *affinis* in that the anterior apex of the head is flattened, not prolonged, with the head almost as broad as long, and the small accessory dorsal head seta is either slightly anterior to, or very close to, the principal dorsal head seta rather than the 2 setae being very well separated and on a horizontal plane. As well, 1 of the ventral anterior head setae on each side is as long as the principal ventral head seta which occurs medially (Fig. 25, 26). It further differs in that the abdominal spiracles are small, and abdominal setae are elongate and only somewhat inflated medially rather than being sword shaped (Fig. 24a, b). It differs from its closest named South American relative, *H. argentina* Werneck, in having 1 apical lobe on

paratergal plate VII (Fig. 9) rather than lacking lobes on this plate.

### LENGTHS

Male holotype, 1.1 mm; female allotype, 1.5 mm; female paratypes, 1.2-1.5 mm; male paratypes, 0.9-1.1 mm.

### DESCRIPTION

**FEMALE** (Fig. 19): *Head* (Fig. 25, male). Only slightly rounded anteriorly, not projecting; almost as broad as long; postantennal angles broad; posterolateral margins slightly convergent posteriorly; separation between the 2 dorsal sclerites horizontal to posterior head margin. First antennal segment ventrally with prominent earlike lobe associated with an anteriorly directed seta. One of anterior subapical ventral setae as long as principal ventral seta; principal dorsal seta with the small accessory seta set very close, and anterior, to it. *Thorax*. Mesothoracic spiracle small; seta medial to spiracle long. Thoracic sternal plate (Fig. 17a) anteriorly angled, posterior extension narrowed only slightly to apex, which is blunt. *Abdomen*. Three narrow sternal and tergal plates per typical segment; their apical setae long and flexible, inflated medially; 1 or more setae laterally off plates on each of segments 4-7 both dorsally and ventrally. First segment lacking tergal plate, but with 2 small, broadly separated setae in this position; tergal plates of segment 2 and first plate of segment 3 poorly developed, each with 4 long, very thin apical setae broadly separated medially into 2 pairs; these setae thin. Paratergal plates (Fig. 9) with spiracles small. Plate III with apical lobes acute (subrounded in some paratypes) and extended laterally; both apical setae longer than apical lobes; Plates III-V with subquadrate apical lobes, one of the apical setae about as long as lobes, other small; plate VI with ventral lobe acute; plate VII with one acute dorsal lobe no longer than plate proper; plate VIII lacking apical lobes. Genital seta rather long, not strongly flattened.

**MALE** (Fig. 20): As female except for usual sexual dimorphism. *Abdomen*. One tergal and 2 sternal plates per typical segment, their apical setae long, slightly inflated medially; several setae off plates both dorsally and ventrally. Paratergal plates as female except apical lobe of VII shorter (Fig. 10) (in one paratype this lobe lacking on both sides, and in another lacking on one side). *Aedeagus* (Fig. 18a). Not distinctive; parameres evenly convex, blunt apically; pseudopenis serrate laterally.

### DISCUSSION

*H. affinis* and its allies have been discussed by Ferris (1921) and Werneck (1937). Ferris



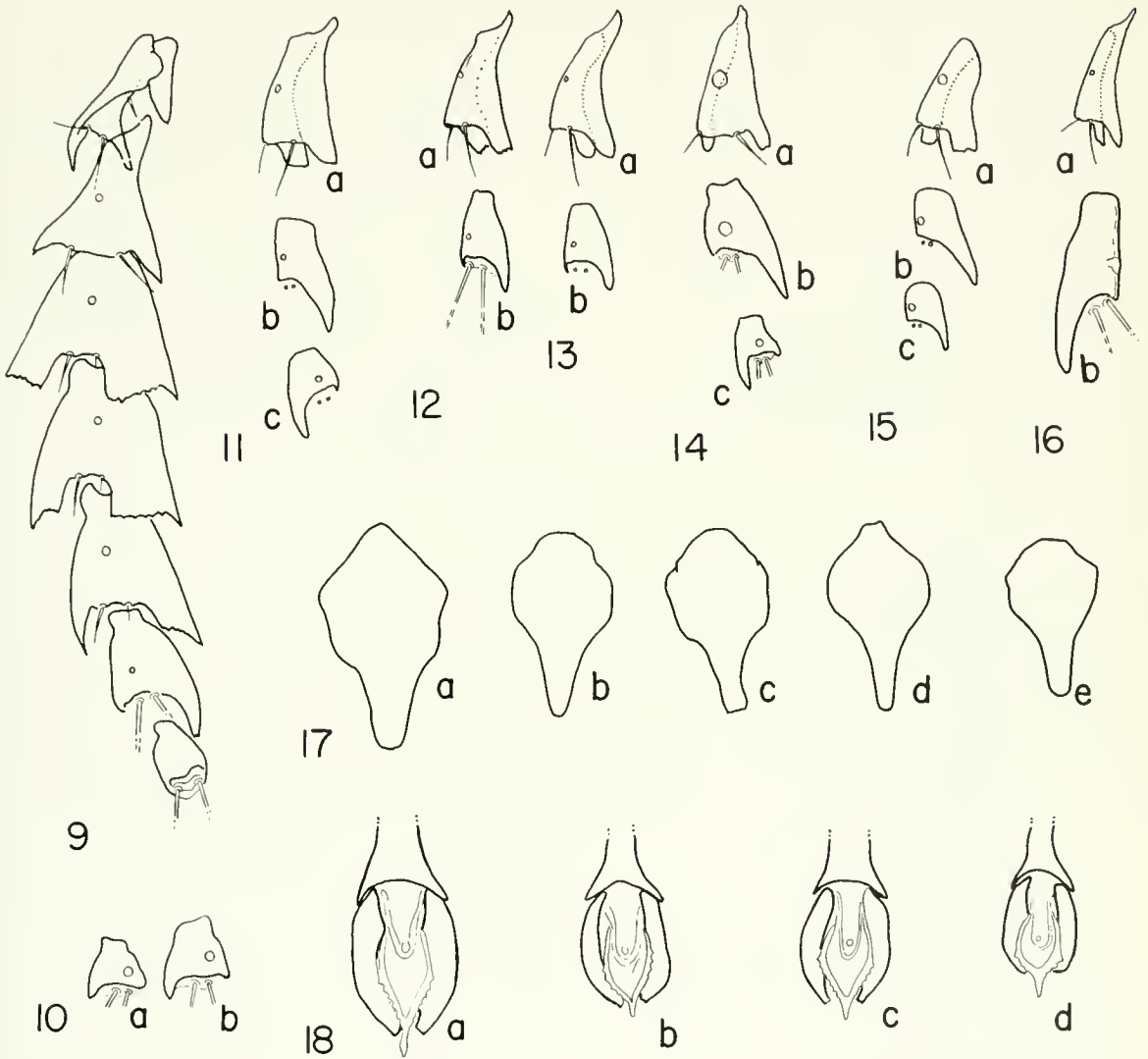


Fig. 9-18. *Hoplopleura affinis* group. Paratergal plates: 9, *H. aitkeni*, new species, female paratype (SVP 14322); 10, same, plate VII, male paratype (a, ex [SVP 13069]; b, ex [SVP 14322]); 11, *H. aitkeni, sensu lato*, plates III and VII Brazil ex "rodent" (a, female, plate III; b, female, plate VII; c, male, plate VII); 12, *H. aitkeni, sensu lato*, female, Ecuador ex *Akodon mollis* (a, plate III; b, plate VII); 13, as Fig. 12; 14, *H. affinis* (Burmeister), Korea, ex *Apodemus agrarius* (a, female, plate III; b, female, plate VII; c, male, plate VII); 15, *H. akenezumi* Sasa, ex *Apodemus speciosus* (a, female, plate III; b, female, plate VII; c, male, plate VII); 16, *H. affinis, sensu lato*, female, Peru ex *Phyllotis* (a, plate III; b, plate VII); 17, thoracic sternal plate, female (a, *H. aitkeni*, allotype; b, *H. aitkeni, sensu lato*, Brazil; c, *H. aitkeni, sensu lato*, Ecuador ex *Akodon mollis*; d, *H. affinis*, Korea ex *A. agrarius*; e, *H. affinis, sensu lato*, Peru ex *Phyllotis*); 18, aedeagus (a, *H. aitkeni*, paratype ex *A. urichi* [SVP 13069]; b, *H. aitkeni, sensu lato*, Brazil; c, *H. affinis*, Korea ex *A. agrarius*; d, *H. affinis, sensu lato*, Peru ex *Phyllotis*).

pointed out that while Old World specimens from *Apodemus speciosus* had notably large spiracles, those from South America had very small ones, and that the thoracic sternal plate is more angular in New World forms. With the specimens at his disposal, Ferris thought it best to include all in one species. Werneck (1937), when he described *argentina* (from *Reithrodon*), partitioned the species into (1) typical

*affinis* from European and Asian Murinae (*Apodemus* species); (2) South American forms from the cricetines *Phyllotis* and *Akodon*, with small spiracles and an angulate thoracic sternal plate; (3) the form from the South American cricetine *Reithrodon*, which also has an angulate thoracic sternal plate and small abdominal spiracles but lacks lobes on paratergal plate VII (*H. argentina*); and (4) a species from the Old

World cricetine genus, *Cricetulus*, with 2 apical lobes on paratergite VII (this was later described as *H. cricetuli* Ferris, 1951).

Sasa (1950) described *H. akenezumi* based on specimens from Japanese *Apodemus speciosus*. This species was characterized by having the pair of setae medial to the mesothoracic spiracles very short, and both setae of paratergal plate III extending beyond the laterally

projecting truncate apical lobes. Kaneko (1956) further divided the *affinis* complex by describing *H. himenezumi* from Japanese *Apodemus sylvaticus* (as *A. argenteus*). In *himenezumi* the mesothoracic dorsomedial setae are long, and the apical lobes of paratergal plate III are truncate and project posteriorly rather than laterally, so that the bay between the lobes is quadrate. Kaneko compared *himenezumi* with speci-

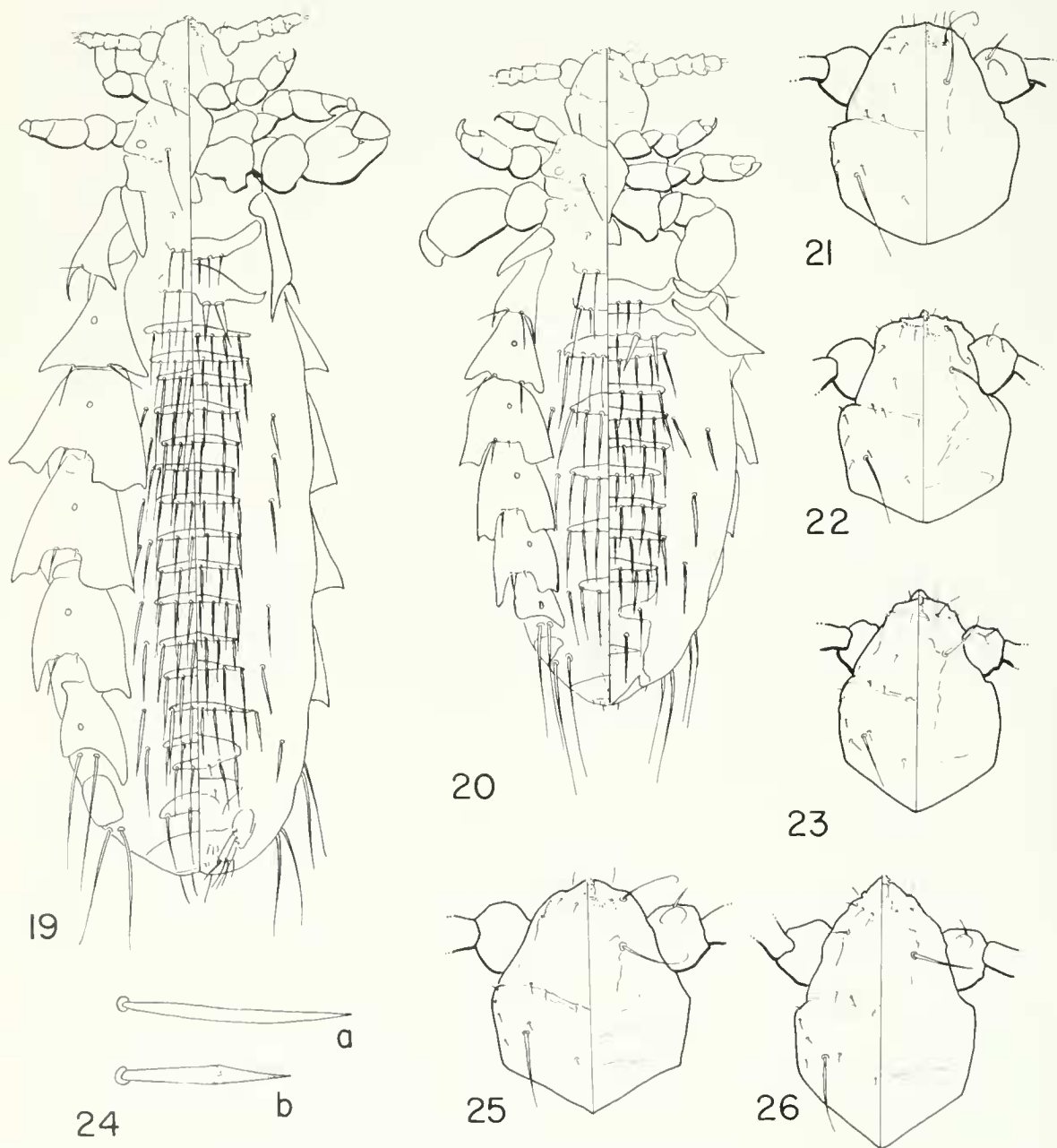


Fig. 19-26. *Hoplopleura affinis* group. 19, *H. aitkeni*, new species, allotype; 20, same, holotype; 21, *H. aitkeni*, *sensu lato*, head, male, Brazil; 22, same, head, female, Ecuador ex *Akodon mollis*; 23, *H. affinis*, *sensu lato*, head, male, Peru ex *Phyllotis*; 24, abdominal setae (a, *H. aitkeni*, holotype; b, *H. affinis*, Korea ex *Apodemus agrarius*); 25, *H. aitkeni*, head, holotype; 26, *H. affinis*, head, male, Korea ex *A. agrarius*.

mens of *affinis sensu strictu*, from an unspecified host from Manchuria.

I have seen specimens from the Old World *affinis* complex from *Apodemus agrarius*, Korea; *Apodemus sylvaticus semotus*, Formosa; and *Apodemus sylvaticus tauricus*, Turkey. Hopkins (1949) has pointed out that by priority of mention, *A. agrarius* is the type host of *H. affinis* (Burmeister). I have examined specimens from South America as follows: the type series of *aitkeni*, new species; two collections from *Phyllotis gerbillus*, Peru (Field Museum of Natural History and U.S. National Museum); one collection from *Akodon mollis*, Ecuador; and a collection from an undetermined rodent, Nova Teutonia, Brazil (Field Museum of Natural History).

All members of the *affinis* complex have well-developed earlike lobes on the venter of the first antennal segment, the size being somewhat dependent upon the species. The specimens from Korean *A. agrarius*, being from the type host, can be considered true *affinis* (Burmeister). They have large spiracles, and the thoracic sternal plate is rounded laterally, not angulate (Fig. 17*d*); the head is prolonged anteriorly (Fig. 26); abdominal setae are sword shaped (Fig. 24*b*); the anteroventral head setae are all short; and the principal dorsal head seta and its accessory seta are on a horizontal plane and well separated. Unlike the male Ferris (1921) figured, from German *A. agrarius*, the apical setae of paratergal plate III, though of different length, both extend beyond the apical lobes (Fig. 14*a*). The apical lobes of plate III vary from rounded-acute to slightly truncate (4 males and 5 females examined). The one pair I saw from *A. sylvaticus*, Turkey, had truncate apical lobes on paratergal plate III.

I consider the specimens from Formosan *Apodemus sylvaticus* (3 males and 5 females) to be *H. akenezumi* Sasa. They are very like *affinis sensu strictu*, but the dorsomedial mesothoracic setae are short and the abdominal spiracles rather small. Paratergal plates III and VII are as in Fig. 15.

Except for the specimens from Peruvian *Phyllotis gerbillus*, the South American representatives of the *affinis* complex have small spiracles; elongate, somewhat inflated setae on the abdomen (Fig. 24*a*); one of the anteroventral head setae prolonged; the accessory and principal dorsal head setae close together, with the accessory seta somewhat anterior; and the preantennal part of the head not as prolonged as in the Old World specimens. Except for size, the male genitalia are similar in all forms (Fig. 18*a, b*). The Peruvian specimens from *Phyllotis* have

the head somewhat prolonged anteriorly (Fig. 23), and none of the anteroventral head setae are especially long. Otherwise, they are similar to *aitkeni*, new species, and other South American specimens. They may represent a different species; but, without comparing further individuals with good host information, it was felt best merely to note the differences and consider these forms to be "*affinis sensu lato*." The others, from Ecuadorian *Akodon mollis* and the undetermined Brazilian rodent are provisionally referred to *H. aitkeni*, new species.

Lengths of the various forms, as mounted on slides, are overlapping: *affinis* (Korea and Turkey): females, 1.15-1.3 mm; males, 0.85-1.0 mm; *akenezumi* (Formosa): females, 1.05-1.2 mm; males, 0.8-0.95 mm; *aitkeni*, new species (Brazil): female, 1.3-1.4 mm; male, 1.1 mm; *aitkeni*, new species (Ecuador): female, 1.25 mm, *affinis sensu lato* (Peru, from *Phyllotis*): female, 1.15 mm; male, 0.9 mm.

*Hoplopleura aitkeni*, new species, is named for Dr. T. H. G. Aitken, Rockefeller Foundation. For a period of years, Dr. Aitken made extensive collections of ectoparasites in Trinidad—the first from that island. They have provided us with extremely valuable information on the hostal and geographic distribution of the South American sucking lice.

#### 4. *Hoplopleura travassosi* Werneck<sup>o</sup> (Fig. 27-29, 31, 37, 42, 47, 48, 57*b*)

*Hoplopleura travassosi* Werneck, 1932:345, Fig. 1.—Werneck, 1934:409, Fig. 1-6.—Hopkins, 1949:469, 471, 495.—Ferris, 1951:127, 143.—Ronderos and Capri, 1966:96.

In the brief original description, types were not designated nor was the sex of the specimens mentioned. The type host, from Brazil: State of Rio de Janeiro, was given as "wild rat." In a later paper, Werneck (1934) said that the type collection consisted of 2 females from *Oryzomys flavescens*. He also recorded further specimens from Brazilian *O. flavescens*, State of Santa Catarina, and from *Kannabateomys amblyonyx* and *Oxymycterus judex* from the same locality. Ronderos and Capri have recorded this species from *Oryzomys flavescens*, Argentina; Province of Buenos Aires. Hopkins (1949) pointed out that the record from the echinimid *Kannabateomys* is probably erroneous. The records from *Oxymycterus* are probably also erroneous or represent accidental occurrence.

In addition to the Venezuelan specimens recorded below, I have seen a series of *travassosi* collected by the American Museum of Natural History in Uruguay. There were 5 females, 3

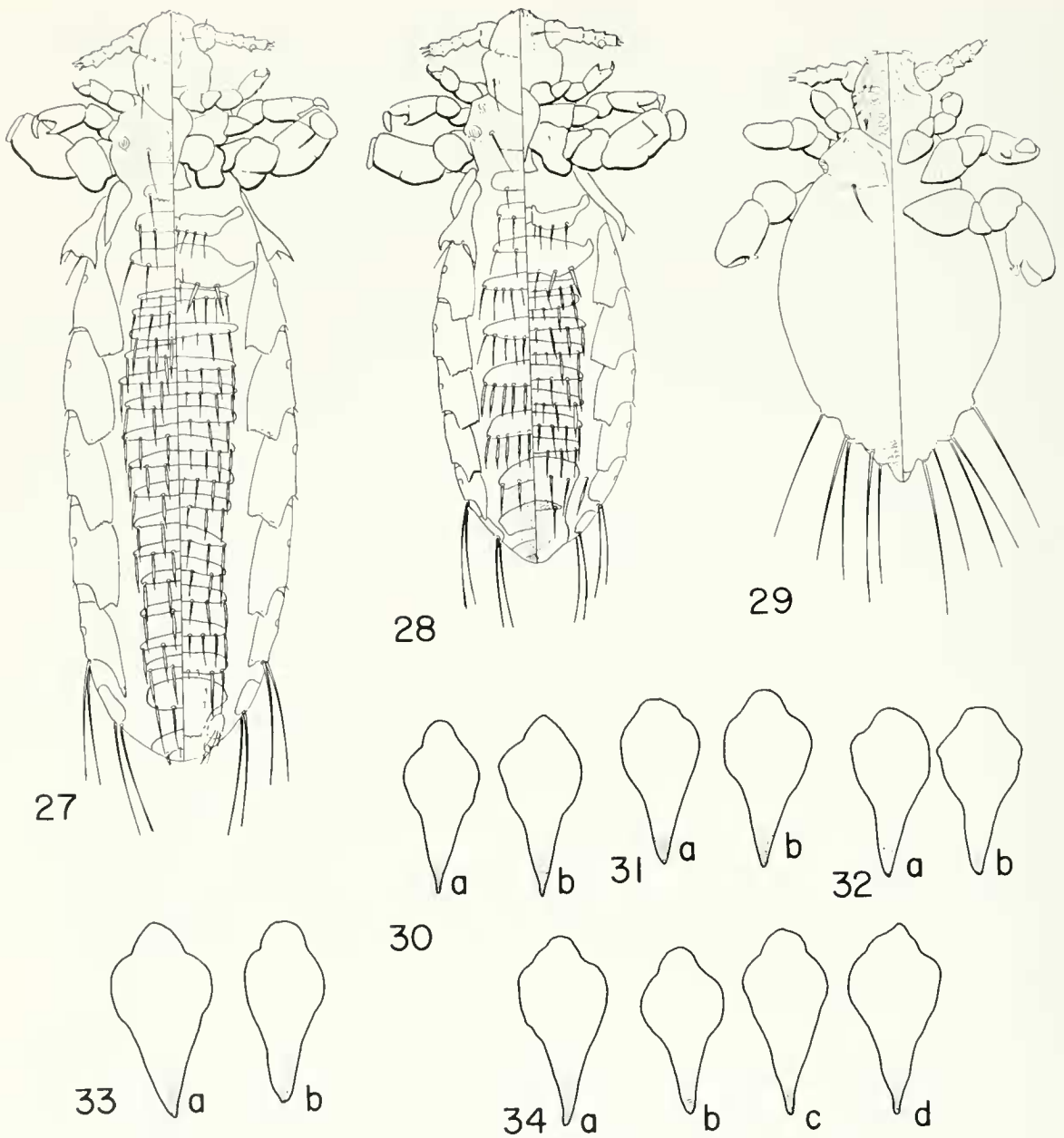


Fig. 27-34. *Hoplopleura travassosi* group. 27 *H. travassosi* Werneck female ex *Oryzomys fulvescens* (SVP 13653). 28, same, male; 29, same, nymph, third instar, Uruguay ex *Oryzomys delticola*, AMNH-205968. Thoracic sternal plate: 30, *H. rimae*, new species (a, holotype; b, allotype); 31, *H. travassosi*, ex (SVP 13653) (a, male; b, female); 32, *H. abeli*, new species (a, holotype; b, allotype); 33, *H. cooki* Kim (a, holotype; b, allotype); 34, *H. similis* Kim (a, holotype; b, allotype; c, female paratype from type collection; d, male, from type collection).

males, and 1 nymph in 5 collections from *Oryzomys delticola*, Departments of Durazno, Tacuarembó, and Maldonado, and 2 females in 2 collections from *Oryzomys flavesceus*, Department of Rocha.

#### VENEZUELAN RECORDS

One female, 1 male ex *Oryzomys fulvescens* (SVP 3745), Dto. Federal, 20 km W Caracas; 5 females, 5 males (SVP 13653, 13677-13712, 14290), same host

but Monagas, near Caripe, 2 females (SVP 14070), same host but Sucre, near Caripe. One female, 2 males ex *O. fulvescens* (SVP 13813, 14037, 14164), Monagas, near Caripe; 65 females, 54 males, 1 nymph ex *O. concolor* (SVP 44125, 44128-44130), Falcon Capatárida; 1 female ex *Rhipidomys venustus* (SVP 13703), Monagas, near Caripe. A collection of 1 female, 2 nymphs ex *O. bicolor* (SVP 43691), Monagas, 55 km SE Maturín, Hato Mata de Bejuco, is doubtfully included in the series of *travassosi*. The very large collection (61 females, 53 males, 1 nymph) attributed to



*O. concolor* (SVP 44130) may have been erroneous since no lice were listed for this number on the original data sheets. The collection from *Rhipidomys venustus* also represents accidental occurrence or is erroneous.

#### DIAGNOSIS

A member of the *hesperomydis-affinis* complex. Closely related to *H. angulata* Ferris. Easily separated by not having the postantennal head margins enlarged (Fig. 48) and by having an apical lobe on paratergal plate VII (Fig. 42). Also very closely related to *cooki* Kim, *similis* Kim, and *torresi* Ronderos and Capri. *H. travassosi* differs from *torresi* by having an apical lobe on paratergal plate VII. It is like *cooki* and *similis* in most respects, but in both sexes *travassosi* has only a single dorsal apical lobe on paratergal plate VII, while females of *similis* and *cooki* have 2 apical lobes on this plate (Fig. 43, 44b), and *cooki* females also have at least an incipient lobe on plate VIII.

#### LENGTHS

Female, 1.25-1.4 mm; male, 1.0-1.05 mm.

#### REDESCRIPTION

**MALE** (Fig. 28): *Head* (Fig. 48). Anteriorly rounded; postantennal angles rounded, not strongly extended; posterolateral margins slightly convex and convergent posteriorly. Principal dorsal seta thin, its accessory seta small, thin, set close to principal one. *Thorax* with seta medial to mesothoracic spiracle long. Sternal plate (Fig. 31) rounded to slightly bulbous anteriorly, evenly tapering posteriorly from rounded lateral angles to an acute posterior apex that has a mesal keel-shaped ridge. *Abdomen*. Tergal plate of first segment (Fig. 57b) with 2 posteroapical setae, these broadly separated but set well in from posterolateral corners; posterior margin serrate; anterior margin concave medially. Tergal plate of segment 2 and first plate of segment 3 with 4 setae each, set in broadly separated pairs. Typical segments with well-developed plates; 2 each ventrally and 1 each dorsally; sternal plates and setae of segments 2-3 arranged as usual. Tergal plates of typical segments with posteromarginal setae large, sword shaped, of even length. Setae of sternal plates also sword shaped, medial ones on each plate smaller than lateral ones. Ventrally, 1 seta off plates, either side, on segment 7. Paratergal plates (Fig. 42, female) III-VI with 2 scaly, quadrate apical lobes and 1 stout short seta that is less than half length of apical lobes. Plates IV-VI, and rarely plate III, with second minute apical seta. Plate VII with narrow, scaly dorsal lobe somewhat less than half the length of plate bearing it. Plates VII-VIII with usual 2 long apical setae. *Aedeagus* (Fig. 37) with pseudo-

penis flared laterally, strongly serrate at this point, apex narrow, often arrow shaped.

**FEMALE** (Fig. 27): As male except in usual sexually dimorphic characters. Tergal abdominal setae sword shaped; setae of sternal abdominal rows sword shaped laterally, smaller and thin medially. No setae off plates. Genital plate divided; genital seta short, acute, blade-like.

**NYMPH** (Fig. 29): Available Venezuelan nymphs were damaged during mounting and not in condition to describe; therefore, this description is based on a single nymph taken from Uruguayan *Oryzomys delticola*. Head flattened anteriorly, with thornlike spicules coronally and ventrally; antennae ventrally spiculated also. Dorsum of head reticulate (not noticeably so in Venezuelan specimens). Principal dorsal head seta stout, short, thornlike, its accessory seta minute; other dorsal head setae small, thornlike. Abdomen with 2 pairs and a single terminal setae on each side. Anal lobe short; posterior apex of abdomen reticulate dorsally (not evident in Venezuelan specimens).

#### DISCUSSION

*H. travassosi* may serve as the typical member of a group in the *hesperomydis-affinis* complex that is characterized by the following: (1) the accessory dorsal head seta is present and near the principal dorsal setae; (2) the thoracic sternal plate is elongate, with its posterior part narrowly triangular, more or less acute, and apically with a longitudinal keellike mesal ridge; (3) there is a well-marked tergal plate bearing 2 posteroapical setae on abdominal segment 1; (4) paratergal plates III-VI have 2 quadrate apical lobes, plate III usually has a single apical seta, and plates IV-VI have 2 apical setae, usually 1 of them minute and the other longer; and (5) females have short, broad, sometimes bladelike genital setae. There are other species that are related to the Neotropical *travassosi* group, but these are not included in this discussion.

All the known *hesperomydis*-like species (not including the *affinis*-related forms) from South America belong to this group. All are from ericetine rodents (*Oryzomys*, *Rhipidomys*, *Calomys*, *Akodon*, *Thomasomys*, *Neacomys*, and *Anotomys*). As well as six new species named and described in this paper, the *travassosi* group includes: *travassosi* Werneck; *similis* Kim (from Mexican *Oryzomys fulvescens* and Bolivian *Oryzomys chaparensis*); *cooki* Kim (from Argentinian *Calomys callosus*); *torresi* Ronderos and Capri (from Argentinian *Oryzomys flavescens*);

and *brasiliensis* Werneck (from *Oryzomys capito* in Brazil and in Trinidad).

*H. travassosi* appears to have the broadest host and geographical distribution; although, especially when nymphs are available in quantity sufficient for definitive study, all the populations may be found not to consist of a single species. In Venezuela the population from *O. fulvescens* that I have called *travassosi* shows

no variation as far as the apical lobes of the paratergal plates are concerned, but the thoracic sternal plate is relatively variable in width and length. The female from *Oryzomys bicolor* has 2 lobes on paratergal plate VII, and the posterolateral head margins are more convex than in the other specimens. Concerning Uruguayan *travassosi*, the head shape may be slightly different from the Venezuelan individuals

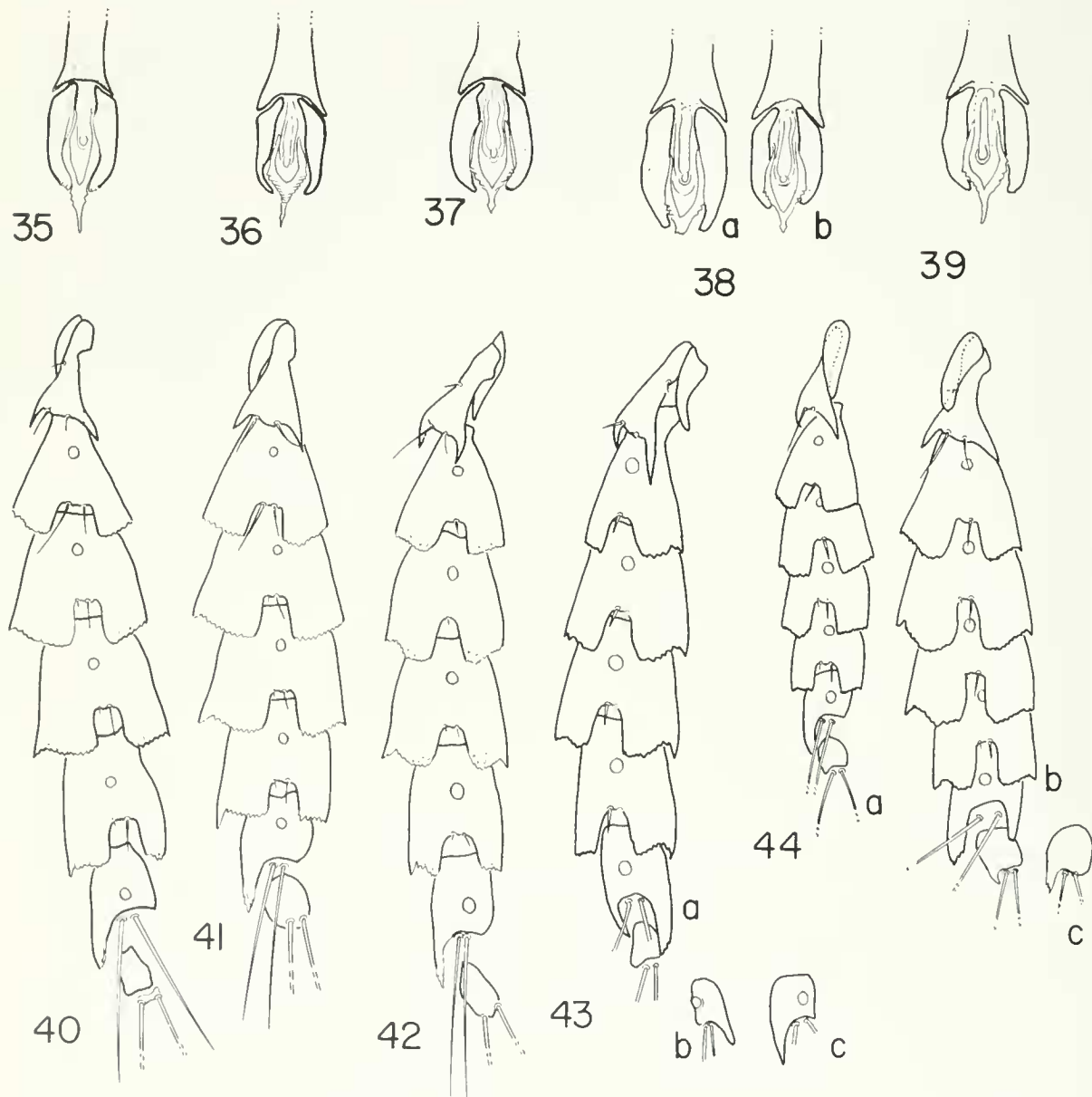


Fig. 35-44. *Hoplopleura travassosi* group. Aedeagus: 35, *H. abeli*, new species, holotype; 36, *H. rimac*, new species, holotype; 37, *H. travassosi* Werneck ex *Oryzomys fulvescens*, (SVP 13653); 38, *H. similis* Kim (a, Mexico from type collection; b, allotype); 39, *H. cooki* Kim, allotype. Paratergal plates: 40, *H. abeli*, female paratype ex *Akodon bogotensis* (SVP 4327); 41, *H. rimac*, female paratype ex *Oryzomys minutus* (SVP 1159); 42, *H. travassosi*, female (SVP 13653); 43, *H. similis* (a, holotype; b, plate VII, allotype; c, plate VII male, Mexico, from type collection); 44, *H. cooki* (a, allotype; b, holotype; c, plate VII, other side of holotype).

from *O. fulvescens* (Fig. 47, 48), but this could be due to differences in mounting. *H. cooki*, *similis*, and *torresi* all differ from *travassosi sensu strictu* mainly in the development of apical lobes on paratergal plates VII-VIII (Fig. 42-44). Not mentioned in the original descriptions is the fact that while females of *similis* and *cooki* have 2 apical lobes on paratergal plate VII, the males, like *travassosi*, have but 1 apical lobe on this plate. This is true of the allotype of *similis* from Bolivia, a male from the same collection as the female holotype (and which was not seen by Kim); and of both the male allotype and a male paratype of *cooki* that I have seen from the Ferris Collection. Females of *H. cooki* have either a small dorsal lobe on plate VIII or an incipient lobe in this position (Fig. 44b, c). The thoracic sternal plate of all these species is very similar (Fig. 31, 33, 34), and heads (Fig. 51-53) and aedeagi (Fig. 38, 39) are also quite similar. *H. cooki* has the dorsal abdominal setae less sword shaped than in the others.

*H. torresi*, judging from the original description and the accompanying figures, differs from *travassosi* mainly in not having an apical lobe on paratergal plate VII. As figured, the thoracic sternal plate is similar to that of *travassosi*. If the host information is correct (both *travassosi* and *torresi* were taken from *Oryzomys flavescens* at the same location in Argentina), probably *torresi* is either a sibling species or a variant of *travassosi*. In a new species from *Oryzomys minutus*, also closely related to *travassosi*, rare, aberrant males lacked an apical lobe on either one or both of paratergal plates VII. The male holotype of a second new species from *Neacomys* lacks the apical lobe on one of these plates. Thus, some variability in lobation may be expected within a single species of the *travassosi* group.

### 5. *Hoploptectura abeli*, new species°

(Fig. 32, 35, 40, 45, 46, 49, 57c)

TYPE DATA: Male holotype, female allotype ex *Akodon bogotensis* (SVP 4284), Venezuela: Merida, 5 km E, 6.5 km S Tabay (Laguna Verde), 3815 m elev., 20-III-66, Peterson team collectors; 2 female paratypes (SVP 4327), as above but 3540 m elev., 22-III-66, Peterson, Parrish, and Tipton collectors; 1 female paratype (SVP 4299), as above but 21-III-66; 1 female and 1 male paratypes ex *A. bogotensis* (SVP 21931), Venezuela: Tachira, 35 km S, 22 km W San Cristobal (Buena Vista), 2400 m elev., 17-III-68, Peterson team collectors; 1 female paratype (SVP

21972), as above but 23-III-68.

Also Examined: 4 females and 1 male ex *Akodon bogotensis* (SVP 3828), Venezuela: Trujillo, 15 km E Trujillo, Hda. Misisi, 2360 m elev., 20-I-66, Peterson team collectors.

### DIAGNOSIS

A member of the *travassosi* group. Close to *travassosi* Werneck. Separable in both sexes by having 2 well-developed apical setae on paratergal plate III (Fig. 40) and with several setae off abdominal plates ventrally. Further separable by the configuration of the tergal plate of the first abdominal segment, which is only lightly sclerotized, not noticeably spiculated, with a scalloped posterior margin, and the apical setae very small and thin (Fig. 57c).

### LENGTHS

Male holotype, 0.95 mm; female allotype, 1.2 mm; female paratypes, 1.2-1.3 mm; male paratype, 1.05 mm.

### DESCRIPTION

MALE (Fig. 46): *Head* (Fig. 49). Rounded-truncate anteriorly; postantennal angles rounded, not protruding; posterolateral margins straight, only slightly convergent posteriorly; principal dorsal seta thin, its accessory seta thin, set close to principal one. *Thorax*. Seta medial to mesothoracic spiracle long. Thoracic sternal plate (Fig. 32) rounded to bulbous anteriorly, posteriorly apex subacute. *Abdomen*. Tergal plate of first abdominal segment (Fig. 57c) faintly sclerotized, its 2 posteromarginal setae rather small, posterior margin scalloped. Tergal plate of segment 2 with 3 thin setae (4 in paratype); first tergal plate of segment 3 with row of 7 thin, posteromarginal setae; lateral ones longer (8 in paratype). Tergal and sternal plates arranged as usual: 2 sternal and 1 tergal plates per typical segment; sternal plates and setae of segments 2-3 as usual. Typical tergal plates with posteroapical setae sword shaped; sternal plates with more lateral posteroapical setae sword shaped, medial setae of these plates smaller, thin; several setae off plates ventrally. Paratergal plates (Fig. 40, female) III-VI with quadrate, weakly fluted apical lobes; III with 2 apical setae, one extending beyond apical lobes; IV-VI with 1 seta about to apex of lobes, other minute. Plate VIII lacking apical lobes. Plates VII-VIII with usual pair of long apical setae. *Aedeagus* (Fig. 35). Pseudopenis extending well beyond apices of parameres, medially flared, then slightly constricted, with a second slightly serrate expansion distad to the medial flare; apex narrow and acute.

FEMALE (Fig. 45): As male except in usual sexually dimorphic characters. Thoracic sternal

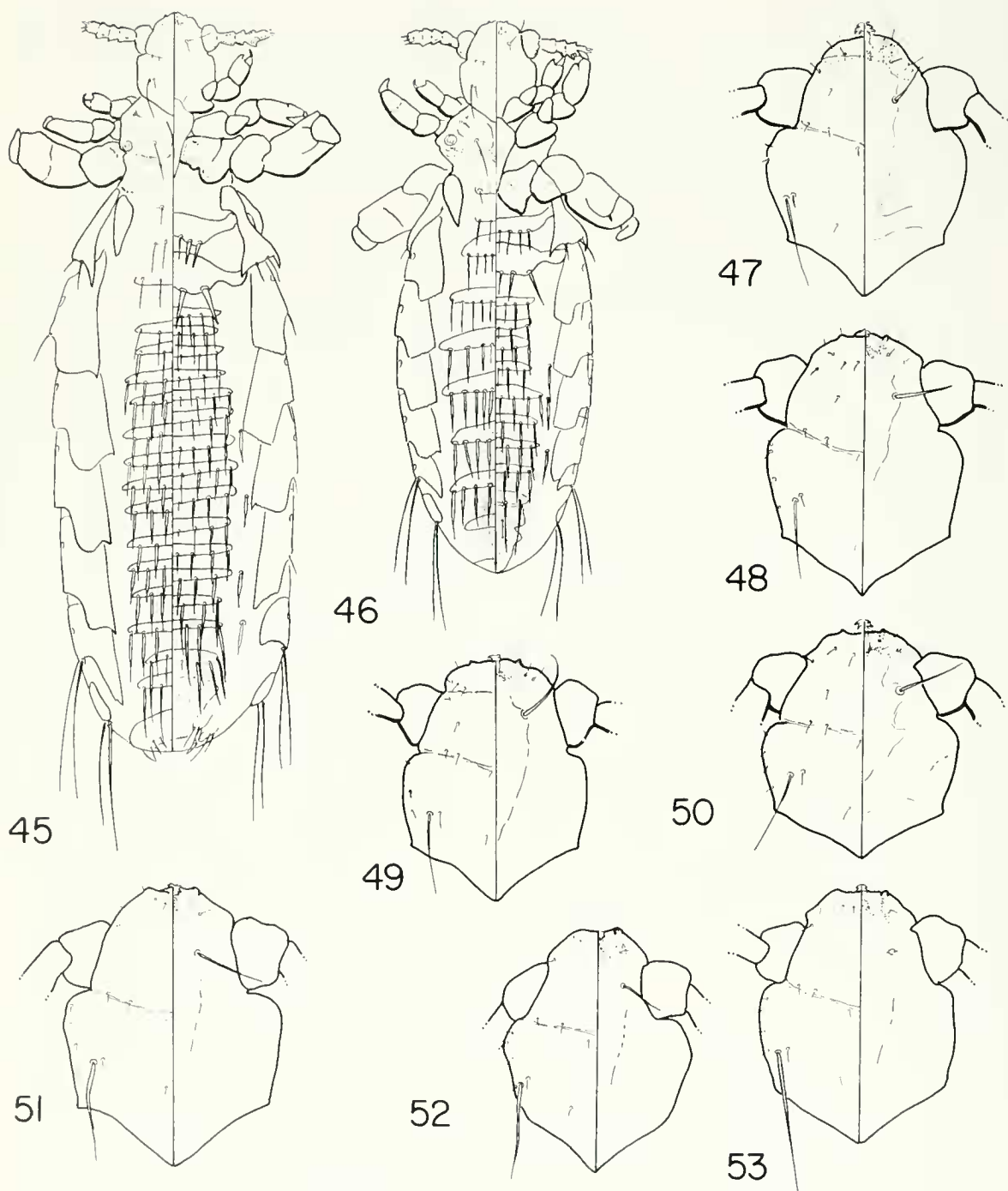


Fig. 45-53. *Hoplopleura travassosi* group. 45, *H. abeli*, new species, allotype; 46, same, holotype. Head, male: 47, *H. travassosi* Werneck, Uruguay; 48, same, ex *Oryzomys fulvescens* (SVP 13653); 49, *H. abeli*, holotype; 50, *H. rimae*, new species, holotype; 51, *H. cooki* Kim, allotype; 52, *H. similis* Kim, allotype; 53, *H. similis*, Mexico, from same collection as types.



plate sometimes blunt rather than acute. Apical setae of abdominal tergal plates broad, sword shaped; those of sternal plates sword shaped, smaller medially; several setae off abdominal plates ventrally. In female allotype second tergal plate of third abdominal segment appears to be missing, thus there are 18, rather than 19, abdominal tergal plates. This plate present in paratypes. Genital plate divided; genital seta short, blade-like.

6. *Hoplopleura rimae*, new species<sup>o</sup>  
(Fig. 30, 36, 41, 50, 54-56, 57a)

TYPE DATA: Male holotype, female allotype, 16 female and 6 male paratypes ex *Oryzomys minutus* (SVP 4190), Venezuela: Merida, 5 km S, 7 km E Tabay (near La Coromoto), 3375 m elev., 17-III-66, Peterson team collectors. There were 276 female and 205 male paratypes in 130 collections ex *Oryzomys minutus*, various localities in Merida, Tachira, Trujillo, Sucre, and Dto. Federal. The majority of collections were from Merida, near Tabay. There were 16 nymphs associated with the adults of the above collections.

Also Examined: From animals other than *O. minutus*, there were 23 specimens of *H. rimae*, new species, taken in 17 collections. Six of the collections and 10 of the specimens were from *Oryzomys albigularis* and *Oryzomys* species. These may represent natural occurrences; the other records were obviously either accidental or due to contamination of some sort.

DIAGNOSIS

A member of the *travassosi* group. Close to *abeli*, new species, and *travassosi* Werneck. Among other characters, separable from *travassosi* by having 2 well-developed setae on paratergal plate III (Fig. 41) and from both *abeli* and *travassosi* in configuration of the tergal plates of abdominal segments 1-3 (Fig. 57a). In both sexes *rimae*, new species, the posterior margin of the tergal plate of segment 1 has a very distinctive fringe of elongate spicules; and the male has a close-set row of broad-based, finely drawn out setae on the tergal plate of abdominal segment 2 and the first plate of segment 3 (Fig. 57a), rather than larger, broadly separated setae in these positions. Further distinct from *abeli* in details of the male genitalia and setation of the abdominal tergal plates (Fig. 36, 55).

LENGTHS

Male holotype, 0.9 mm; female allotype, 1.2 mm; female paratypes, 1.15-1.3 mm; male paratypes, 0.85-0.95 mm.

DESCRIPTION

MALE (Fig. 55): *Head* (Fig. 50). Anteriorly rounded, postantennal angles convex, not extended; posterolateral margins slightly convergent posteriorly; principal dorsal seta thin, its accessory seta set close to it. *Thorax*. Seta medial to mesothoracic spiracle long. Sternal plate (Fig. 30) bulbous anteriorly, posterior apex narrowly acute, with mesal keel. *Abdomen*. Tergal plate of segment 1 with posterior margin drawn out into a number of fine points, giving deeply scalloped appearance (Fig. 57a), its 2 posteromarginal setae rather small, set near posterolateral angles. Tergal plate of segment 2 and first plate of segment 3 each with close-set medial group of posteromarginal setae (9 in holotype) that are broad basally and rapidly drawn out into fine points (Fig. 57a). Second tergal plate of segment 3 and to a lesser extent, tergal plate of segment 4, with similar but more broadly spaced, longer setae. Remaining tergal plates with sword-shaped apical setae. Sternal plates with sword-shaped setae laterally, medial setae smaller, not sword shaped. Ventrally, 1 or 2 setae off posterior plates. Paratergal plates (Fig. 41, female) III-VI with 2 quadrate, slightly scaly apical lobes; plate III with 2 well-developed apical setae, 1 longer than lobes; plates IV-VI with 1 seta about one-half length of lobes and 1 seta minute. Plate VII with triangular dorsal lobe about same length as plate proper. Plates VII-VIII with usual pair of long setae. In one paratype, apical lobe of paratergal plate VII missing on one side, in a second paratype, both lobes of plate VII missing. These males were in a collection containing normal males taken near the type locality of the species. *Aedeagus* (Fig. 36) with parameres bent inward apically; pseudopenis strongly flared and serrate medially, posterior part narrowed to acute apex.

FEMALE (Fig. 54): As male except in usual sexually dimorphic features and as follows: tergal plate of abdominal segment 2 and first plate of segment 3 each with 4 normal setae on posterior margin, placed in broadly separated pairs. Apical setae of more posterior tergal abdominal plates sword shaped; sternal plates with lateral setae sword shaped, medial ones smaller, thin; ventrally, 1 or more setae off posterior plates. Genital plate divided; genital seta short, acute, blade shaped.

NYMPH (Fig. 56a, b): Both stages represented have head anteriorly flattened; principal dorsal head seta short, spinelike; other dorsal head setae small, not especially thickened. Anal lobe broad, rounded, or triangular apically;

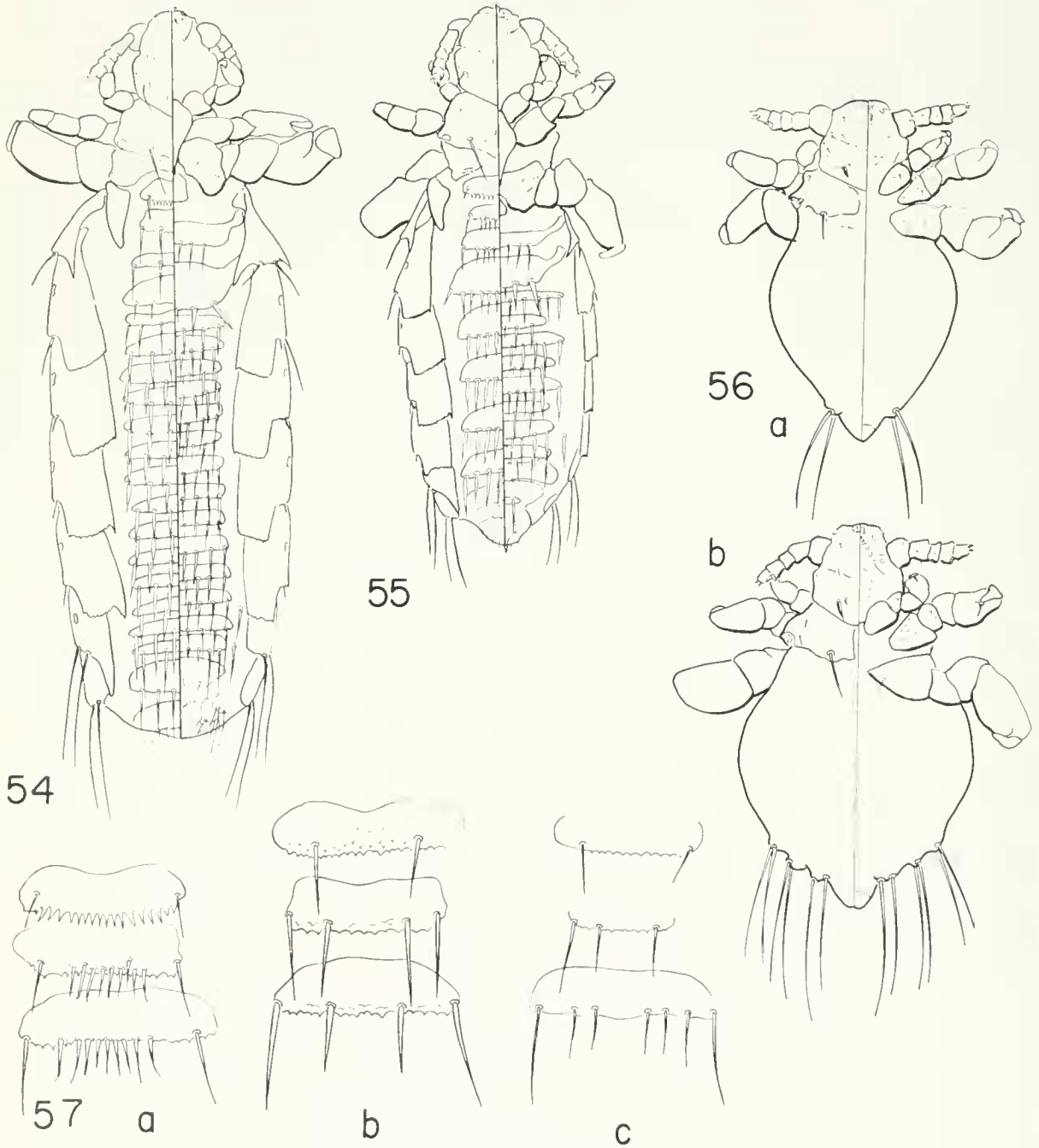


Fig. 54-57. *Hoplopleura travassosi* group. 54, *H. rimae*, new species, allotype; 55, same, holotype; 56, same, nymph, ex *Oryzomys minutus* (a, second instar [SVP 3958], b, third instar [SVP 3965]; 57 tergal plates of abdominal segments 1-3, male (a, *H. rimae*, holotype; b, *H. travassosi* ex *O. fulvescens* [SVP 13677], c, *H. abeli*, holotype).

ventral sclerotization of anal lobe is posteriorly evenly concave and does not extend as far posteriorly as dorsal sclerotization. Third instar (Fig. 56b) with 3 pairs terminal abdominal setae on each side, these set on tubercles. What is probably the second instar (Fig. 56a) has 1 pair terminal setae on each side and dorsal thoracic seta is not elongate.

7. *Hoplopleura angulata* Ferris<sup>o</sup>  
(Fig. 58-59)

*Hoplopleura angulata* Ferris, 1921:73, Fig. 40, 41a-c, c. — Hopkins, 1949:470. — Ferris, 1951:129, 133.

The female holotype was from *Rhipidomys venezulae*, FCM 7048, Venezuela. Ferris also recorded the species from *Rhipidomys* sp., USNM 194500 (= *leucodactylus*, fide Hopkins, 1949), Peru; Río San Miguel; *Rhipidomys venustus*, USNM 137507, Venezuela; Merida; and *Thomasomys cinereus* FCM 19824, Peru; Balsas.

From the Ferris Collection, I have examined 2 females and 1 male ex *R. leucodactylus*, Peru; Río San Miguel. From Colombia I have seen one collection of 1 female and 2 males ex *Rhipidomys latimanus*, Department of Valle, Municipio de Cali, no. HTC-1337, H. Trapido collector (Rockefeller Foundation), and from Panama, 2 males ex *Nectomys sumichrasti*, Province of Chiriquí, Cerro Punta. *H. angulata* also occurs in Trinidad. I have examined one collection, supposedly from *Zygodontomys*. I suspect human error was involved in the host designation.

VENEZUELAN RECORDS

One hundred eleven females, 77 males, 3 nymphs ex *Rhipidomys venustus* in 14 collections—including a collection of 83 females, 62 males, 3 nymphs (SVP 3889), Trujillo—from Dto. Federal, Trujillo, and Monagas; 1 female, 7 males ex *R. venezulae* (SVP 546), Dto. Federal 3 km N Caracas, 1500 m elev.; 175 females, 117 males ex *R. couesi* (SVP 13343, 13450), Sucre, 7 km N 5 km E Güira, 4 m elev.; 13 females, 3 males ex *Rhipidomys macconnelli* in 10 collections, Bolívar and T. F. Amazonas; 26 females, 27 males ex *Rhipidomys goodfellowi* (SVP 17224), T. F. Amazonas, 84 km SSE Esmeralda, 138 m elev.; 3 females ex *Rhipidomys caucensis* (SVP 8945), Bolívar, 85 km SSE El Dorado, 1032 m elev. There were also 12 other collections from *R. venezulae*, *Oryzomys coucolor*, and *Rhipidomys* species, including 31 females, 14 males, and 12 nymphs, from various localities in Tachira, Falcon Bolívar and Lara.

DIAGNOSIS

A member of the *travassosi* group. Distinct by having the postantennal angles of the head strongly extended and angulate, and with the posterolateral head margins very convergent posteriorly (Fig. 61). Further separable by a

combination of the following: paratergal plates VII-VIII lack apical lobes (Fig. 60), the posterior apex of the thoracic sternal plate has the lateral margins straight and evenly convergent to the acute apex (Fig. 63-66), and the pseudopenis of the aedeagus is markedly angulate and serrate medially, with the lateral arms converging rapidly to a narrow, drawn-out apex (Fig. 62).

LENGTHS

Female, 1.5-1.8 mm; male, 1.1-1.2 mm.

DESCRIPTION

MALE (Fig. 59): *Head* (Fig. 61). Anteriorly rounded; postantennal angles extended, angulate; posterolateral margins straight, strongly convergent posteriorly; principal dorsal seta stout, long, its accessory seta almost thornlike; other dorsal setae small, thin; first antennal segment large. *Thorax*. Seta medial to mesothoracic spiracle long; sternal plate (Fig. 63-67) of variable dimensions, rounded to almost angled anteriorly, rounded laterally, always posteriorly narrowing to acute apex that bears a mesal keel (this is not indicated in Fig. 64-67). *Abdomen*. Two ventral rows of setae and plates, and 1 dorsal row and plate per typical segment; sternal plates and setae of segments 2-3 arranged as usual; ventral setae long, thin, not sword shaped; tergal plate of segment 1 well developed, posterior margin bearing many short, fine, acute points, the 2 posteroapical setae broadly separated. Tergal plates of segments 2-5 with lateral posteroapical setae markedly longer than thin, acutely drawn out medial setae. Lateral setae of posterior segments especially somewhat inflated medially, none sword shaped. Ventrally, 1 seta off plate on either side on segment 7. Paratergal plates (Fig. 60, female) with II bearing acute dorsal and ventral apical lobes and 2 apical setae, 1 of them extending about to apex of lobes, and other beyond lobes; plates III-VI with squared dorsal and ventral lobes posteriorly serrate, slightly excavate, and drawn out laterally into short points; plate III with 2 stout apical setae, 1 extending beyond lobes, the other almost reaching apex of lobes. Plates IV-VI with 1 stout seta slightly shorter than apical lobes, and 1 minute seta. Plates VII-VIII lacking apical lobes; each with usual pair of long setae. *Aedeagus* (Fig. 62). Parameres with straight lateral margins, apices blunt; pseudopenis flared, angled and serrate medially; rapidly converging to narrow apex that extends well beyond parameres.

FEMALE (Fig. 58): As male except for usual sexually dimorphic characters. Three sternal and 3 tergal plates per typical abdominal

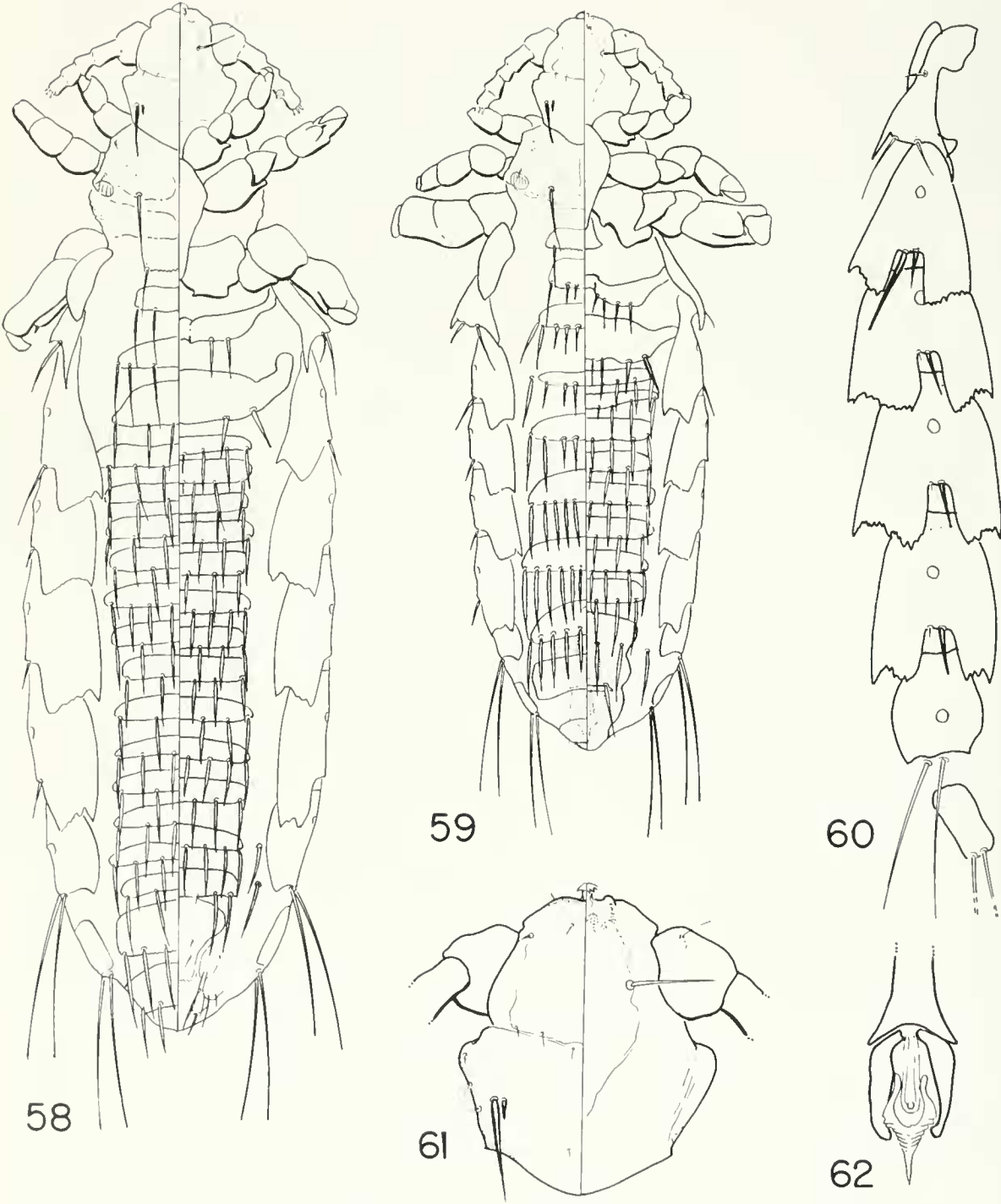


Fig. 58-62. *Hoplopleura angulata* Ferris, ex *Rhipidomys couesi* (SVP 13343). 58, female; 59, male; 60, paratergal plates, female; 61, head, male; 62, aedeagus.



segment; abdominal setae somewhat inflated medially, not sword shaped; setae off plates ventrally on segment 7; genital plate divided; genital setae stout, short, blade shaped.

**NYMPH** (Fig. 68, 69): Head of all stages with marked lateral postantennal angles; post-antennal area very broad; principal and accessory dorsal head setae stout, thornlike; head and antennae tuberculate ventrally. Abdomen

scaly, at times with pair of minute ventral setae near thorax, but sometimes these not evident. With short, narrow anal lobe that has ventral sclerotization shorter than dorsal one and excavate on each side so that it has medial point, appears scalloped. *Third instar* (Fig. 69). Usually with 3 pairs of terminal abdominal setae on each side, but in 1 specimen the most anterior seta is a single, not paired. *Second instar* (Fig.

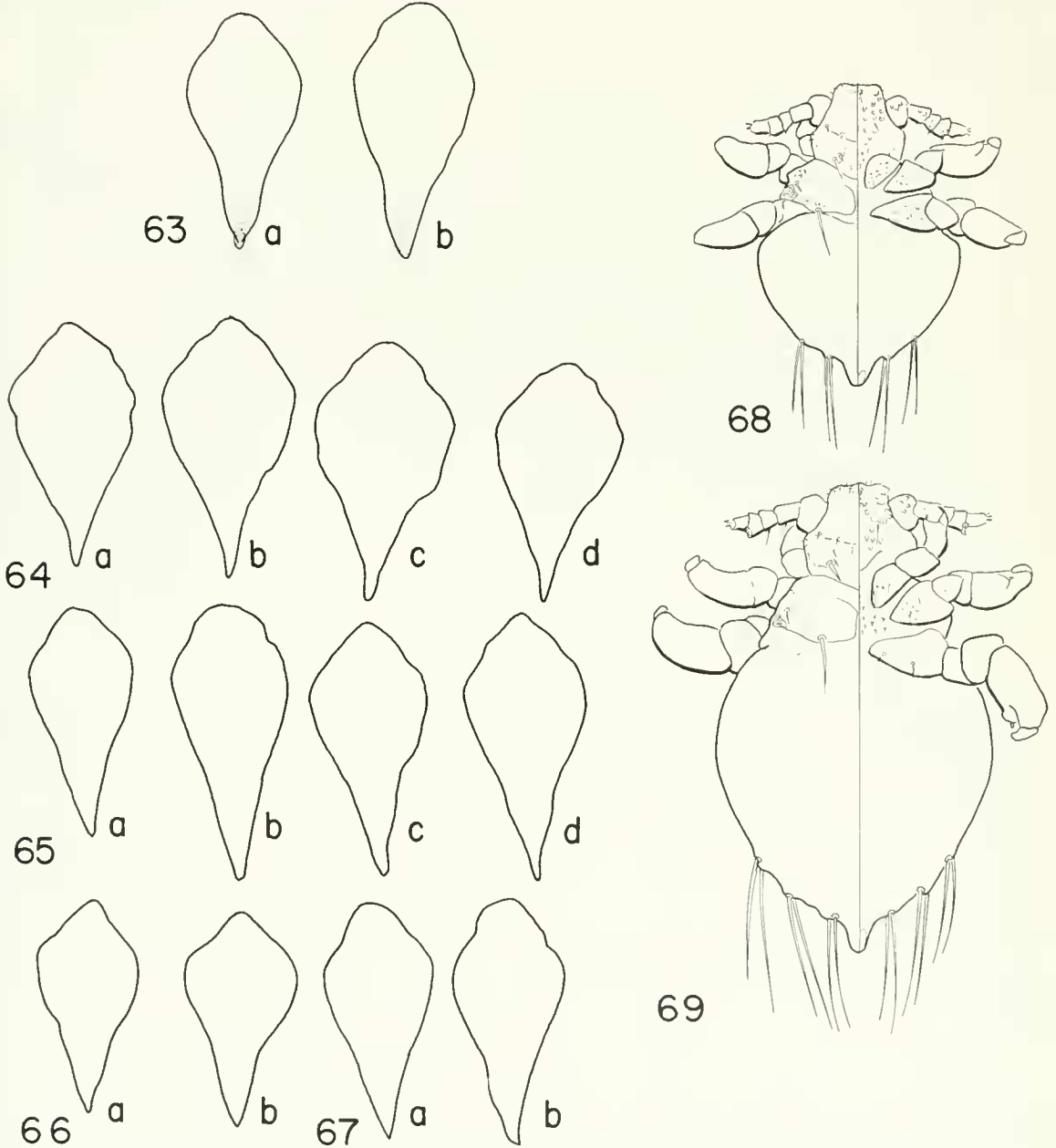


Fig. 63-69. *Hoplopleura angulata* Ferris. Thoracic sternal plates: 63, ex *Rhipidomys couesi* (SVP 13343) (a, male; b, female); 64, ex *R. goodfellowi* (SVP 17224) (a and d, male; b and c, female); 65, ex *R. couesi* (a, male, ex [SVP 13450]; b, female, same; c, male, ex [SVP 13343]; d, female, same); 66, ex *R. macconnelli* (SVP 8006) (a, male; b, female); 67, ex *R. venustus* (SVP 3832) (a, male; b, female); 68, nymph, second instar, ex *Rhipidomys* species (SVP 42802); 69, nymph, third instar ex *Oryzomys concolor* (SVP 43870).

68). Has 2 pairs terminal abdominal setae; anterior pair represented by only a single seta in a single specimen from the same collection as abnormal third instar. *First instar*. Much as others. Posterior abdomen of only available specimen telescoped; thoracic dorsal setae very long; third pair of legs no larger than second; 2 long, stout, terminal setae on each side of abdomen.

#### DISCUSSION

Few nymphs were taken in the Venezuelan survey, and most of them were from as yet undetermined species of *Rhipidomys*. Therefore, there is no way at present of evaluating the variation in setal numbers exhibited by 2 of the nymphs—from *R. venustus*, Trujillo (SVP 3889). Remaining nymphs were all from unclassified species of *Rhipidomys*. The adult *H. angulata* included in the present series do not vary consistently according to the host species except that the thoracic sternal plates appear to differ according to the host (Fig. 63-67).

*H. angulata* is the typical anopluran parasite of *Rhipidomys* species. Other species of sucking lice were taken from *Rhipidomys* so seldom that all such records may be considered due to straggling or error. Only 15 specimens of *angulata*, in 9 collections, were taken from Venezuelan mammals other than *Rhipidomys*, also demonstrating the strong relationship between the insect and its mammalian host.

#### *S. Hoplopleura indiscreta*, new species\*

(Fig. 70-75)

TYPE DATA: Male holotype, female allotype, 7 female and 2 male paratypes ex *Thomasomys lugens* (SVP 4442), Venezuela: Merida, 5 km E, 1 km S Tabay, 2710 m elev., 15-IV-66, Peterson collector; 2 male paratypes ex *T. lugens* (SVP 3813, 3971), Merida: 3 km W Timotes, 3172 m elev., 14-II-66, Peterson team collectors.

Also Examined: 1 female ex *Thomasomys laniger* (SVP 4133), Merida, 5 km S, 7 km E Tabay, 3250 m elev., 15-III-66, Peterson, Parrish, and Tipton collectors.

#### DIAGNOSIS

A member of the *travassosi* group. Close to *angulata* Ferris and *travassosi* Werneck. Like *angulata*, the postantennal angles of the head are well developed and extended laterally (Fig. 74) though not as markedly as in *angulata*. Separable from *angulata* in that paratergal plate VII has a dorsal apical lobe (Fig. 72); the tergal plate of abdominal segment 2 has a close-set row of about 10 short setae with broad

bases that are rapidly drawn into fine points (Fig. 71), and the aedeagus is different (Fig. 75). Like *travassosi* in having a lobe on paratergal plate VII. Differs from that species, among other characters, in the shape of the head and aedeagus, and by having 2 apical setae on paratergal plate III rather than only 1 short seta there. In the male, *indiscreta* is distinct from both *travassosi* and *angulata* by having only 1 long apical seta on paratergal plate VII.

#### LENGTHS

Male holotype, 1.0 mm; female allotype, 1.45 mm; female paratypes, 1.3-1.45 mm (one paratype female measured 1.15 mm owing to telescoping of the thorax and abdomen during mounting); male paratypes, 1.0-1.05 mm.

#### DESCRIPTION

MALE (Fig. 71): *Head* (Fig. 74). Rounded anteriorly, first antennal segment large, third and fourth segments with spiniform setae dorsally. Postantennal angles marked; posterolateral margins straight, convergent posteriorly. Principal dorsal seta normal, not thickened, its accessory seta thin. *Thorax*. Seta medial to mesothoracic spiracle long. Sternal plate (Fig. 73) rounded anteriorly, slightly bulbous laterally, posterior apex acute but not narrowly so, bearing mesal keel. *Abdomen*. Tergal and sternal plates large; 1 dorsal and 2 ventral plates per typical segment; sternal plates and setae of segments 2-3 arranged as usual. Tergal plate of segment 1 strongly spiculate, its posterior margin serrate, bearing 1 small posteromarginal seta at each posterolateral corner. Tergal plate of segment 2 and first plate of segment 3 with posteroapical row of about 10 short, broad-based setae drawn into thin points; these setae flanked at posterolateral corners by 1 longer, normal seta. Posteromarginal setae on succeeding tergal plates longer, somewhat inflated medially, lateral posteromarginal setae of sternal plates slightly sword shaped. No setae off abdominal plates. Paratergal plates (Fig. 72, female) with II having both apical angles acute and with 2 apical setae about as long as lobes; plates III-VI with squared dorsal and ventral apical lobes that have posterior margins fluted or pleated in appearance; plate III with both apical setae well developed; plates IV-VI with 1 well-developed seta not reaching apex of lobes, plus a small seta (larger seta is relatively longer in male than in female); plate VII with narrowed truncate dorsoapical lobe and only 1 long apical seta; plate VIII lacking lobes, with usual pair of long apical setae. *Aedeagus* (Fig. 75). Elongate, parameres slightly convex laterally,

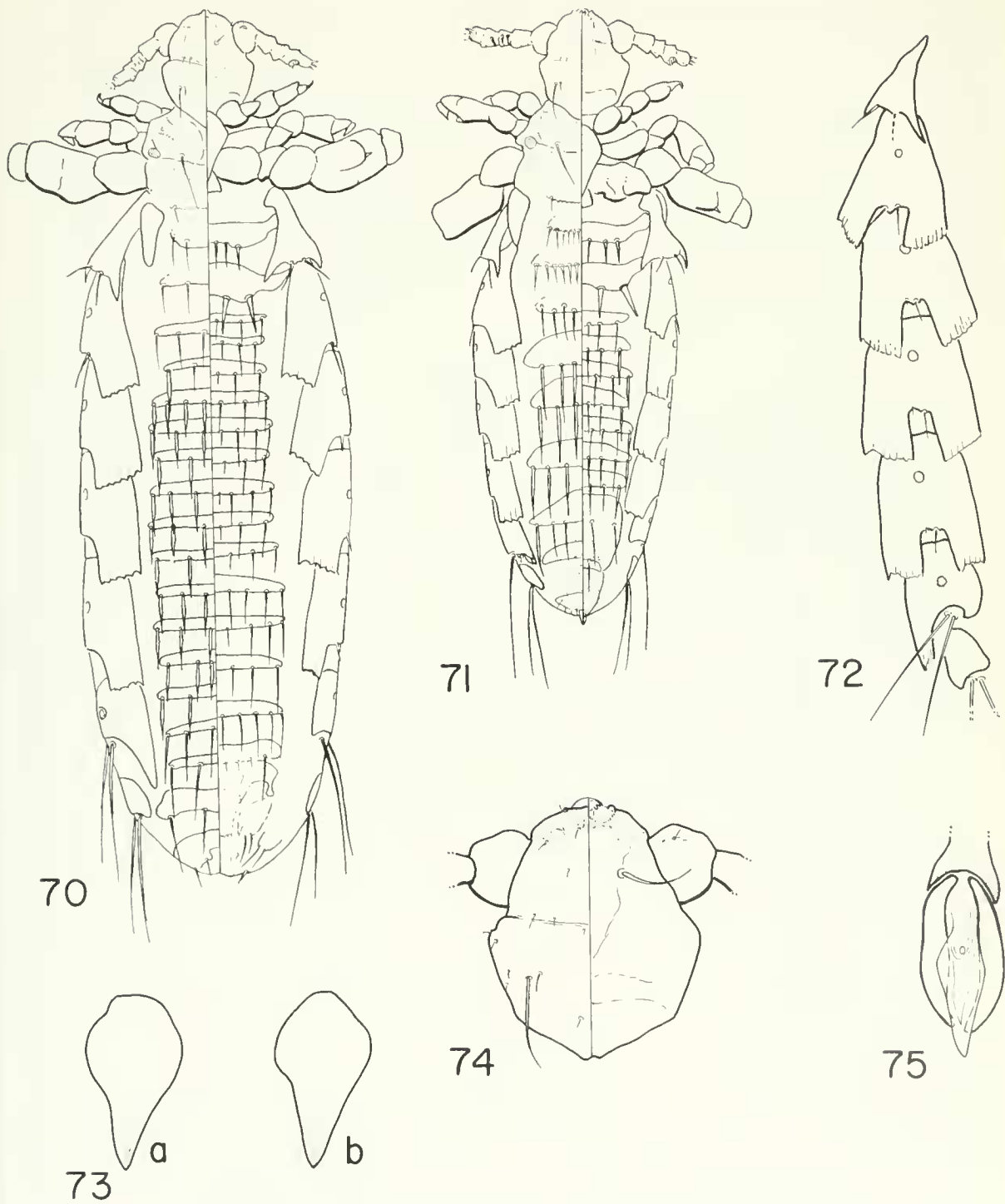


Fig. 70-75. *Hoplopleura indiscreta*, new species. 70, allotype; 71, holotype; 72, paratergal plates, allotype; 73, thoracic sternal plate (a, holotype; b, allotype); 74, head, holotype; 75, aedeagus, holotype.

pseudopenis not flared, smoothly and evenly convex laterally, lacking lateral serrations, posterior apex rather broad.

**FEMALE** (Fig. 70): As male except in sexually dimorphic features. Dorsal setae of antennal segments 3-4 not enlarged; setae of paratergal plates not extending close to apex of lobes, plate VII with usual pair of long setae; 3 sternal and tergal plates per typical abdominal segment; sword-shaped setae on dorsal plates, ventral setae thinner; genital plate divided; genital seta short, stout, bladelike.

9. *Hoplopleura tiptoni*, new species°  
(Fig. 76-82)

**TYPE DATA:** Male holotype, female allotype, 2 female paratypes ex *Thomasomys laniger* (SVP 4050), Venezuela: Merida, 4 km S, 6.5 km E Tabay (La Coromoto), 3170 m elev., 12-III-66, Peterson, Parrish, and Tipton collectors; 1 male paratype (SVP 4111), as above but 3185 m elev., 15-III-66; 1 female, 1 male paratypes (SVP 4089), as above but 3180 m elev., 13-III-66; 1 female, 2 male paratypes (SVP 4100, 4101), as above

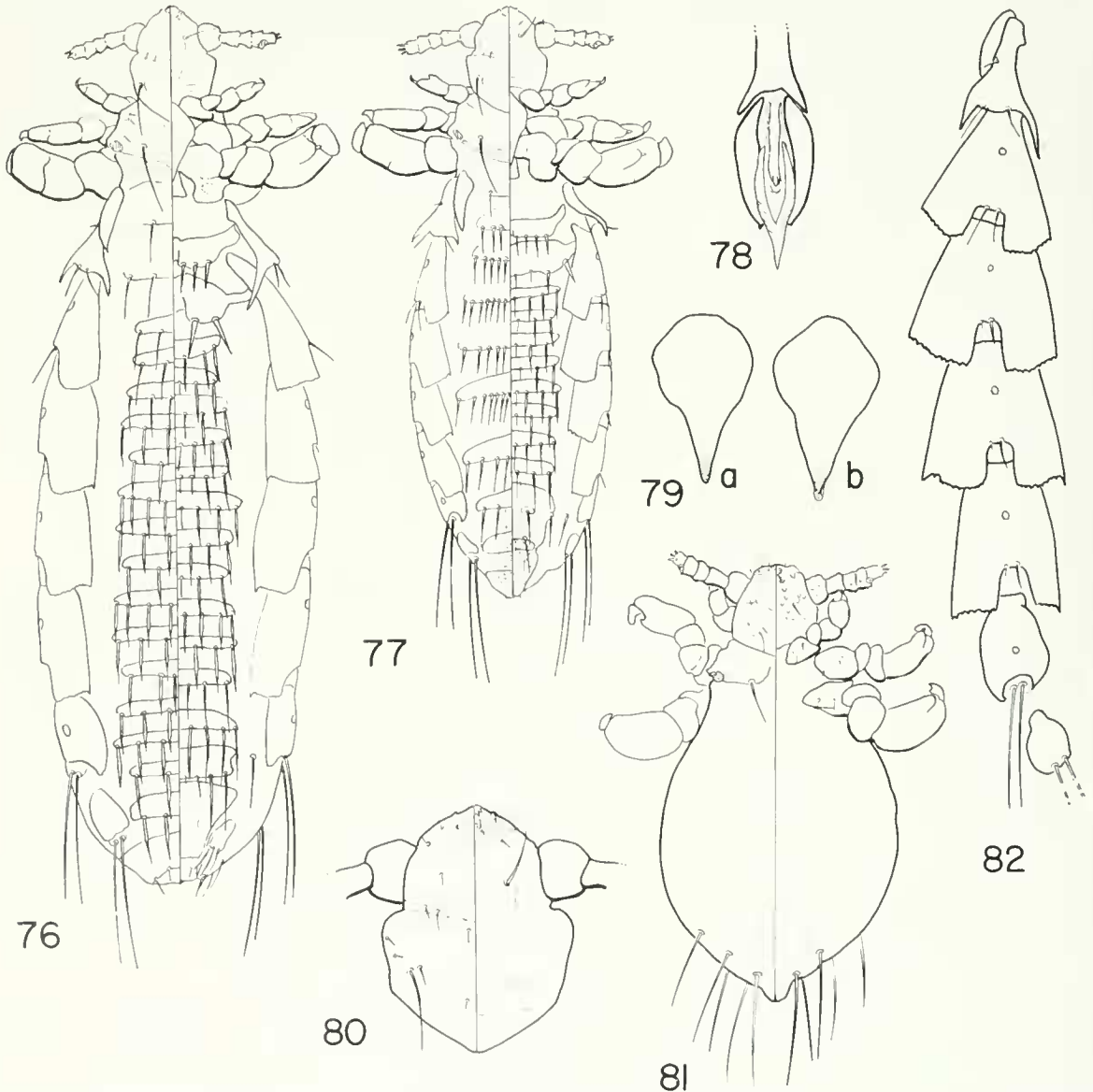


Fig. 76-82. *Hoplopleura tiptoni*, new species, ex *Thomasomys laniger*. 76 allotype; 77, holotype; 78, aedeagus, holotype; 79, thoracic sternal plate (a, male paratype [SVP 4111]; b, allotype); 80, head, holotype; 81, nymph, third instar (SVP 4101); 82, paratergal plates, allotypes.



but 5 km S, 7 km E Tabay, 3210 m elev., 14-III-66; 4 female paratypes (SVP 4300), as above but 7.5 km E, 6 km S Tabay, 3560 m elev., 21-III-66, Peterson team collectors.

Also Examined: 1 male ex *Akodon urichi* (SVP 143), Dto. Federal, 3 km N Caracas, 1630 m elev., 23-VII-65, Peterson and Tuttle collectors; 1 male ex *Oryzomys minutus* (SVP 4083), Merida, 4 km S, 6.5 km E Tabay (La Coromoto), 3160 m elev., 13-III-66, Parrish and Tipton collectors.

#### DIAGNOSIS

A member of the *travassosi* group. Closely related to *angulata* Ferris and, like that species, lacking apical lobes on paratergal plate VII. A smaller species than *angulata*. Distinct in that the postantennal angles of the head are not enlarged and extended laterally (Fig. 80); the thoracic sternal plate is bulbous laterally rather than being elongate and evenly narrowing posteroapically (Fig. 79); the pseudopenis is not flared medially or strongly serrate (Fig. 78); and the dorsal setation of the male abdomen is different (Fig. 77). Also closely related to *H. torresi* Ronderos and Capri (known from a single female ex *Oryzomys flavesceus*, Argentina). Differing from that species by having 2 well-developed setae on paratergal plate III, rather than only 1; and the setae of the tergal plate of abdominal segment 1 are small and thin, rather than being about as large as the other dorsal abdominal setae. In the nymph, *tiptoni* differs from *angulata* in that the principal dorsal head seta and other dorsal head setae of *tiptoni* are not short, stout, or thornlike, and the postantennal region of the head is not strongly broadened (Fig. 81).

#### LENGTHS

Male holotype, 0.95 mm; female allotype, 1.5 mm; female paratypes, 1.3-1.45 mm; male paratypes, 0.95-1.0 mm.

#### DESCRIPTION

**MALE** (Fig. 77): *Head* (Fig. 80). Anteriorly slightly projecting, narrowly rounded; postantennal angles marked; lateral postantennal margins only slightly convergent posteriorly. Principal dorsal seta long, its accessory seta on same horizontal plane; no dorsal setae minute. *Thorax*. Seta medial to mesothoracic spiracle long. Sternal plate (Fig. 79) rounded anteriorly, laterally bulbous, rapidly narrowed to acute posterior apex which has mesal keel. *Abdomen*. Tergal plate of segment 1 indicated but not complete, bearing 2 thin, short posteroapical setae; other sternal and tergal plates as usual; sternal plates of segments 2-3 normally modified.

One tergal and 2 sternal plates per typical segment; tergal plates with close-set rows of setae that are slightly inflated medially and drawn out into fine points; apical setae of sternal plates less numerous, slightly sword shaped; no setae off plates dorsally or ventrally. Paratergal plates (Fig. 82, female) with III-VI scaly, with truncate apical lobes; plate III with 2 apical setae about as long as lobes; plates IV-VI each with 1 seta less than length of lobes plus 1 small seta; plates VII-VIII lacking apical lobes, with usual pair of long apical setae. *Aedeagus* (Fig. 78). Elongate; parameres slightly convex; pseudopenis not sharply angled laterally, not strongly serrate, with narrowly triangular apex.

**FEMALE** (Fig. 76): As male except for usual sexually dimorphic characters. Typical abdominal segments each with 3 sternal and 3 tergal plates, their apical setae slightly sword shaped, no setae off plates in allotype, sometimes 1-2 off plates ventrally in paratypes. Genital plate divided; genital seta short, bladelikey.

**NYMPH** (Fig. 81): Only third stage represented. Head broad, flattened anteriorly, no dorsal setae thornlike, principal dorsal seta well developed, other dorsal setae small but not minute. Abdomen scaly, a single and 2 pairs terminal abdominal setae on each side. Anal segment scarcely prolonged. Abdomen of only specimen broken; drawing approximates its normal state.

This species is named for one of the directors of the Venezuelan mammal-ectoparasite survey, Dr. V. J. Tipton, in recognition of his long and fruitful association with the taxonomy and biology of ectoparasites.

#### 10. *Hoplopleura handleyi*, new species\* (Fig. 83-89)

**TYPE DATA:** Male holotype, female allotype, 7 female and 1 male paratypes ex *Neacomys tenuipes* (SVP 91), Venezuela: Dto. Federal, 3 km N Caracas, Los Venados, 1465 m elev., 22-VII-65, Peterson and Tuttle collectors.

#### DIAGNOSIS

A member of the *travassosi* group. Closest to *brasiliensis* Werneck but much less heavily sclerotized than that species. Female like *brasiliensis* in having the genital plate joined medially, rather than being separated into plates as is true in all other members of this group. The male, like *brasiliensis*, has all setae on the tergal abdominal plates drawn out into thin

points (Fig. 84). Separable from *brasiliensis* by having only 1 apical lobe on paratergal plate VIII, and with a long seta medial to the mesothoracic spiracle.

#### LENGTHS

Male holotype, 1.1 mm; female allotype, 1.5 mm; female paratypes, 1.4-1.5 mm; male paratypes, 1.1 mm.

#### DESCRIPTION

**MALE (Fig. 84):** *Head* (Fig. 88). Anteriorly slightly projecting, truncate; postantennal

angles rounded; posterolateral margins slightly convex; principal dorsal seta set quite near lateral margin, its accessory seta and other dorsal setae minute. *Thorax*. Seta medial to mesothoracic spiracle long. Sternal plate (Fig. 86) rounded, almost bulbous anteriorly; posterior apex acute, with mesal keel. *Abdomen*. Tergal plate of segment 1 with 2 large posteromarginal setae. Posteromarginal setae of remaining tergal plates all large, long, drawn out into very thin points. Setae of sternal plates also drawn into thin points. No setae off abdominal plates.

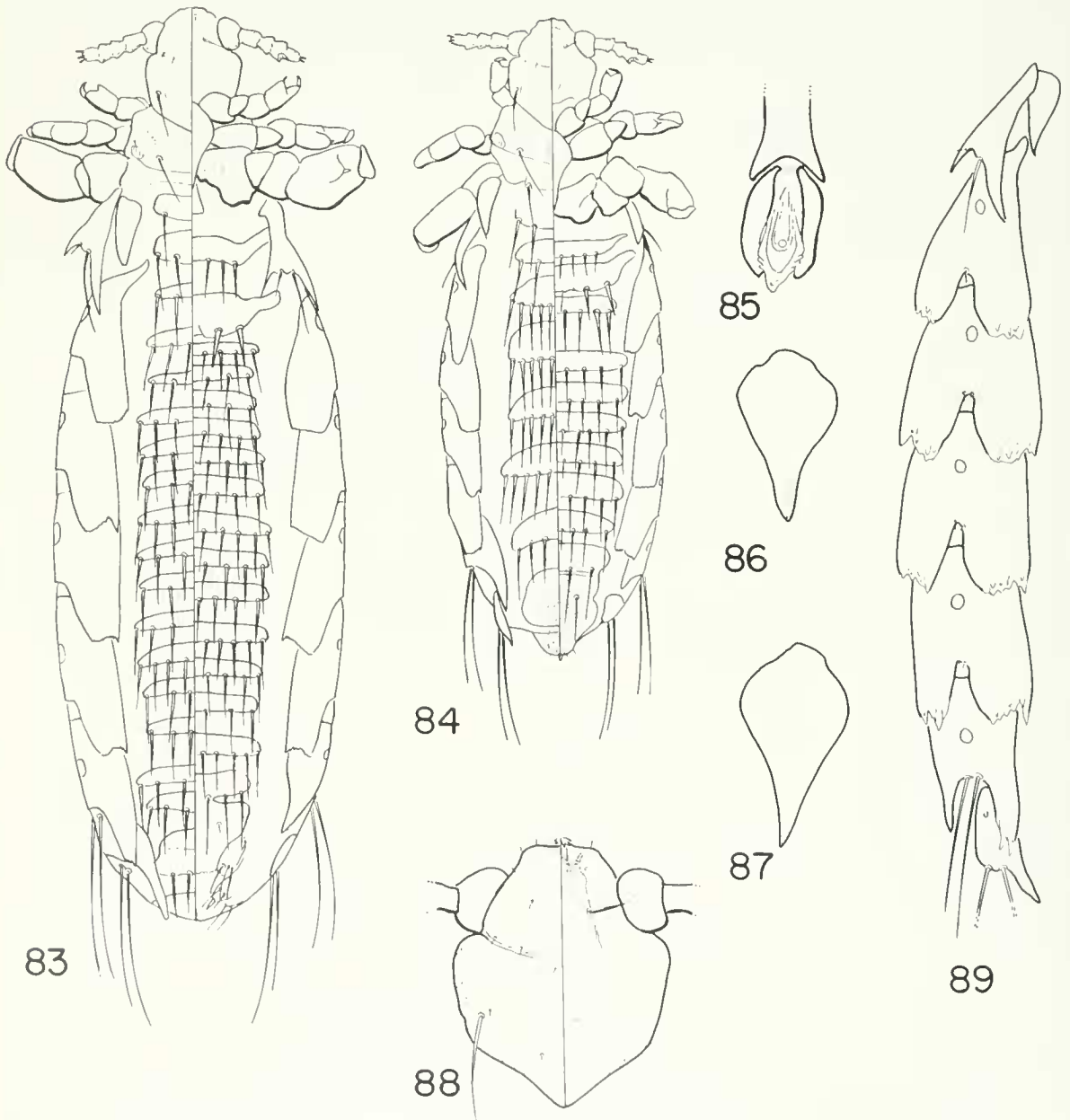


Fig. 83-89. *Hoplopleura handleyi*, new species. 83, allotype; 84, holotype; 85, aedeagus, holotype; 86, thoracic sternal plate, holotype; 87, same, allotype; 88, head, holotype; 89, paratergal plates, allotype.

One tergal and 2 sternal plates per typical segment, these plates well developed. Sternal plates of segments 2-3 as usual in genus. Paratergal plates (Fig. 89, female) scaly, III-VI with 2 long apical lobes, bay between lobes narrow; plate VII with 2 acute apical lobes; plate VIII with single, acute, dorsoapical lobe, this lobe missing on one side in holotype. Plate II with 1 small seta and 1 seta reaching apex of lobes; plate III with 1 minute apical seta; plates IV-VI with 2 minute setae; plates VII-VIII with usual pairs of long setae. *Aedeagus* (Fig. 85). Pseudopenis flared medially, with lateral margins weakly serrate; turned up apically, but apex apparently acute.

**FEMALE** (Fig. 83): Essentially as male except in sexually dimorphic characters. Thoracic sternal plate elongate-acute posteriorly (Fig. 87); all abdominal setae large, tapering to long acute points; no setae off plates. Genital plate joined medially; genital seta short, blade shaped.

This species is named for Dr. C. O. Handley, Jr., U.S. National Museum, in recognition of his outstanding contributions to the study of Central and South American mammals and their ectoparasites.

#### 11. *Hoplopleura brasiliensis* Werneck (Fig. 90-95)

*Hoplopleura brasiliensis* Werneck, 1932a:754, Fig. A, B.—Werneck, 1932b:235. — Ferris, 1951:126, 134.

The female holotype, male allotype, and a series of female and male paratypes were taken from a "wild rat" (species and genus unknown), Brazil: State of Goyaz.

*H. brasiliensis* was not taken during the Venezuelan surveys. However, its presence in neighboring Trinidad and in Brazil on *Oryzomys capito*, which also occurs in Venezuela, suggests that it probably occurs in Venezuela as well. In Trinidad *H. brasiliensis* is a typical parasite of *O. capito*, and from Dr. Aitken I have 13 collections of this species from *O. capito*. Dr. Aitken also collected 20 females and 8 males of *brasiliensis* in 3 collections ex *O. capito*, Brazil: Anapá Territory.

#### DIAGNOSIS

A member of the *travassosi* group. Most aberrant of the group. Separable in both male and female from other South American members of the group by having a very small seta medial to the mesothoracic spiracle; 2 well-developed apical lobes on paratergal plate VIII (Fig. 95); and the head as broad as long, with the heavily sclerotized postantennal margins

parallel, the principal dorsal head seta very near the lateral margin, with its small accessory seta just anterior, rather than medial, to the principal seta (Fig. 94). *H. brasiliensis* is closest to *handleyi*, new species, from *Neacomys*.

#### LENGTHS

(Brazilian specimens) female, 1.55-1.7 mm; male, 1.35-1.4 mm.

#### DESCRIPTION

**FEMALE** (Fig. 90): A well-sclerotized, large species. *Head* (Fig. 94, male). As broad as long, posterolateral margins parallel, strongly sclerotized; all dorsal setae except principal dorsal seta minute. Principal dorsal seta set very near lateral margin of head. *Thorax*. Seta medial to mesothoracic spiracle very small, near spiracle. Sternal plate (Fig. 92) triangular anteriorly with long, acute posterior apex that has an indication of a mesal keel. *Abdomen*. Sternal plates and setae of segments 2-3 as usual in genus. Typical segments each with 3 large, faintly scaly tergal and sternal plates, their apical setae stout, sharply pointed, not sword shaped. No setae off plates. First segment with well-developed tergal plate bearing 2 apical setae similar to other abdominal setae. Paratergal plates (Fig. 95) faintly scaly; III-VII with 2 quadrate apical lobes with deeply serrate posterior margins; plate III with 1 small apical seta; plates IV-VI with 2 small setae, dorsal one minute; plate VIII with 2 long acute, subequal apical lobes. Tergal plate of segment 8 with 9-11 large, close-set posteroapical setae. Genital plate joined medially; genital seta not strongly flattened.

**MALE** (Fig. 91): As female except in sexually dimorphic characters. Dorsally 1 or 2 setae on antennal segments 3-4 enlarged, thorn-like. One tergal and 2 sternal plates per typical abdominal segment. Tergal plate of first abdominal segment with the 2 apical setae rather short, stout. Typical tergal plates with close-set rows of 10-14 setae that are stout at base and drawn out apically to sharp points. Setae of sternal plates stout, acutely pointed, not as drawn out. No setae laterally off plates. *Aedeagus* (Fig. 93). Elongate; parameres only slightly convex laterally; pseudopenis serrate laterally, blunt tip extending only slightly beyond parameres.

#### 12. *Hoplopleura exima*, new species<sup>\*</sup> (Fig. 96-100)

**TYPE DATA:** Unique male holotype ex *Anotomys trichotis* (SVP 21973), Venezuela: Tachira, 35 km S, 22 km W San Cristobal (Buena

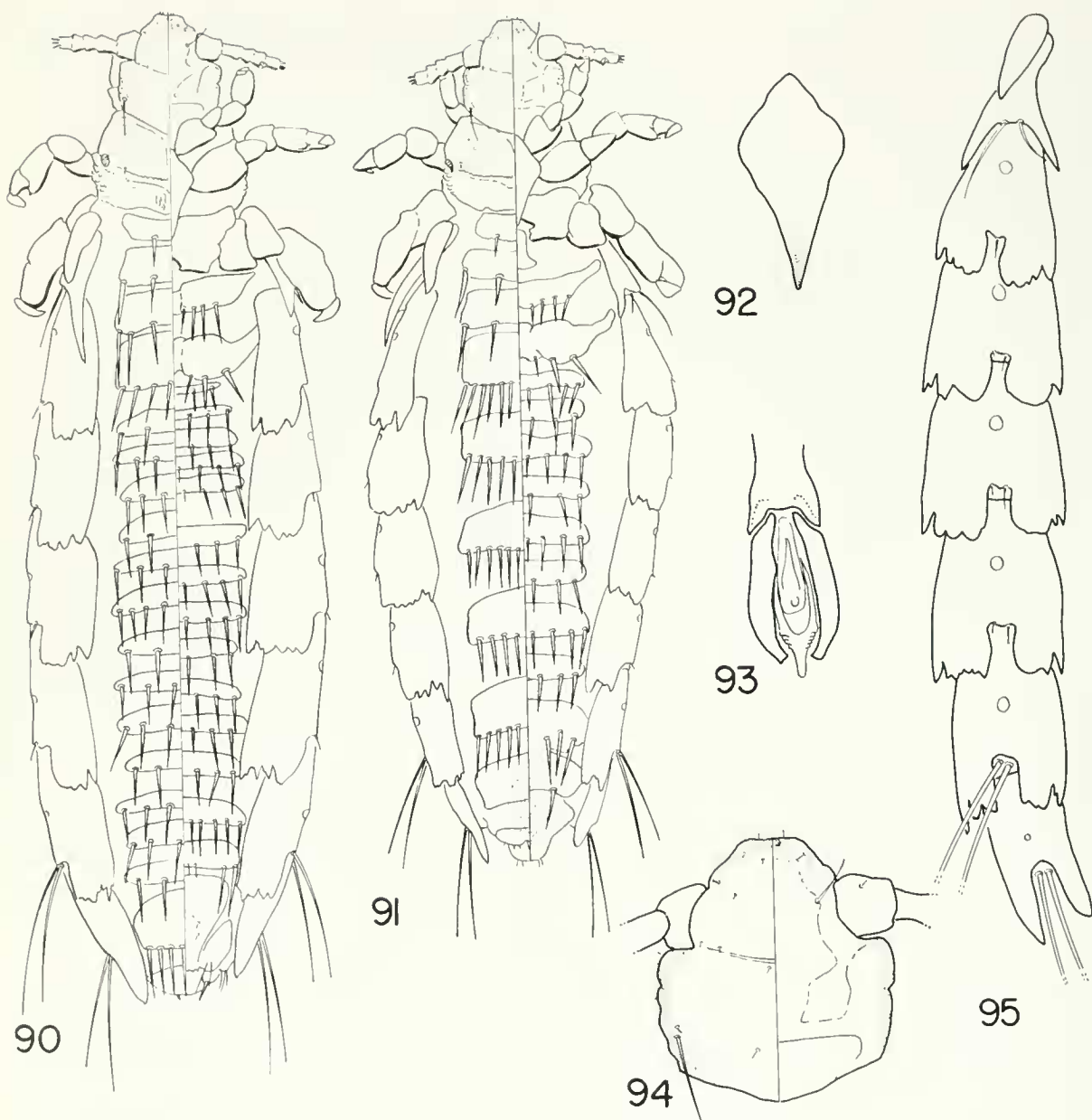


Fig. 90-95. *Hoplopleura brasiliensis* Werneck, Brazil ex *Oryzomys capito*, RO-8610. 90, female; 91, male; 92, thoracic sternal plate, female; 93, aedeagus; 94, head, male; 95, paratergal plates, female.

Vista), 2400 m elev., 24-III-68, Peterson team collectors. *Anotomys trichotis*, a water rat, is known from only a few specimens and the present individual was the only one taken during the Venezuelan surveys. Dr. Handley (private communication) says that *Anotomys*, although a cricetine, is morphologically and ecologically far removed from the other hosts of the *Hoplopleura* species known from Venezuela.

#### DIAGNOSIS

A member of the *travassosi* group. Like *an-*

*gulata* Ferris in lacking apical lobes on paratergal plate VII (Fig. 99), but separable in that the postantennal angles of the head are not extended (Fig. 100). Distinct from all members of the *travassosi* group because the apical lobes of the paratergal plates have their apices set diagonally, with the bay between them much broader apically than basally.

#### LENGTH

1.1 mm.

#### DESCRIPTION

MALE (Fig. 96): Head (Fig. 100). Round-



ed anteriorly; postantennal angles rounded, not extended; posterolateral margins straight, slightly convergent posteriorly; principal dorsal seta normal in size and position, its accessory seta larger and stouter than other dorsal setae. *Thorax*. Seta medial to mesothoracic spiracle long. Sternal plate (Fig. 97) rather blunt posteroapically, with indistinct mesal keel. *Abdomen*. Tergal plate of first segment indistinct, its 2 posteroapical setae long. Typical segments each with 2 sternal and 1 tergal plates;

sternal plates of segments 2-3 arranged as usual. No dorsal setae sword shaped. Ventral setae similar, smaller to middle of rows. Paratergal plates (Fig. 99) with both apical setae of II well developed, 1 reaching apices of lobes; plate III with both apical setae extending beyond apices of lobes; plates IV-VI with 1 seta extending to apices of lobes, other minute. Apical lobes of III-VI quadrate, angled outward so that apex of each lobe set diagonally, and bay between lobes broadened distally. Plates

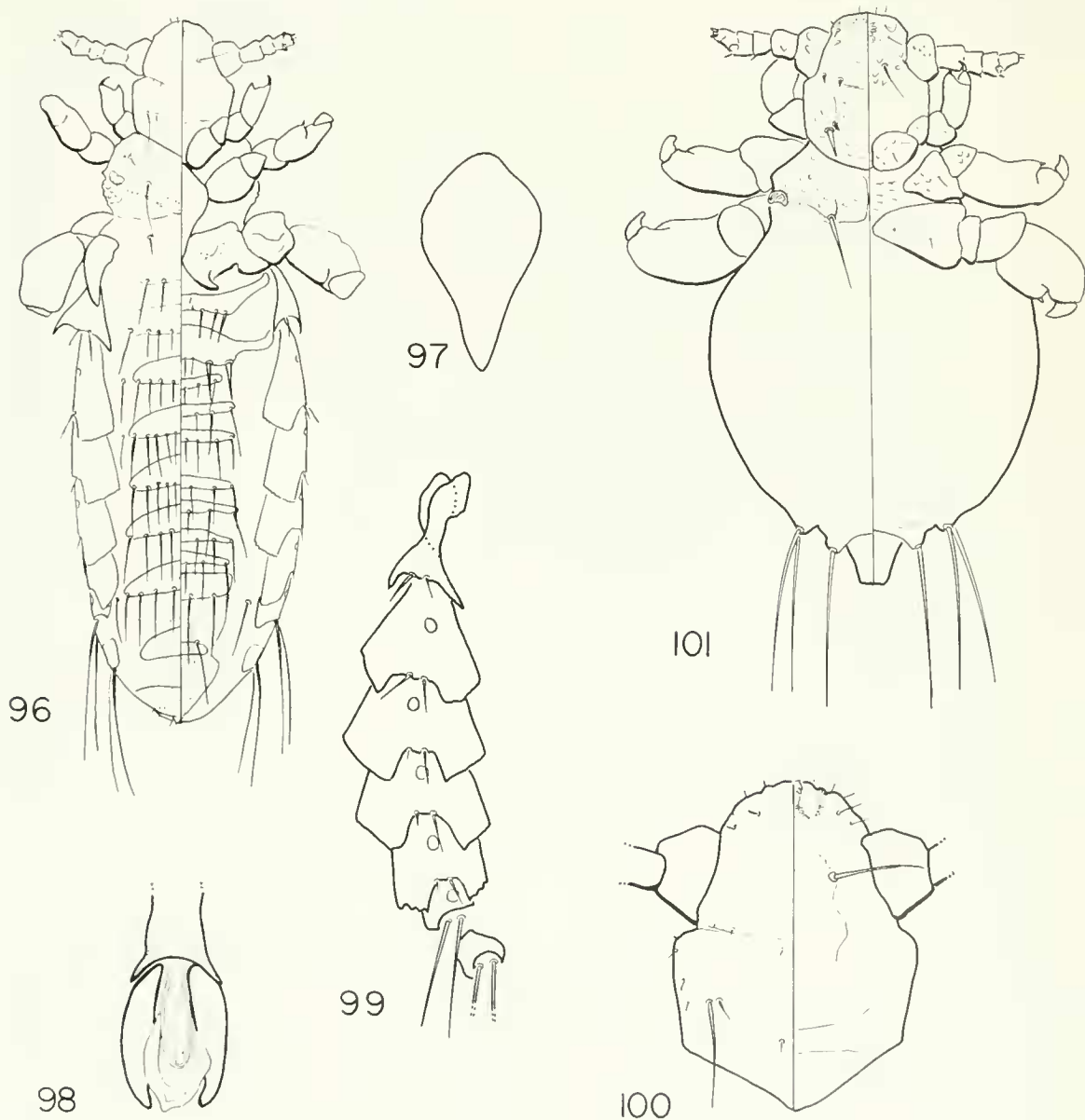


Fig. 96-101. *Hoplopleura* species. 96, *Hoplopleura exima*, new species (male) (*travassosi* group), ex *Anatomys trichotis* (SVP 21973); 97, same, thoracic sternal plate; 98, same, aedeagus; 99, same, paratergal plates; 100, same, head, 101, *H. quadridentata* (Neumann), nymph, third instar, ex *Nectomys squamipes* (SVP 41964).

VII-VIII lacking apical lobes, each with usual long pair of setae. *Aedeagus*. In poor condition in only specimen, as in Fig. 98.

13. *Hoplopleura quadridentata* (Neumann)\*  
(Fig. 101-107)

*Haematopinus* (*Polyplax*) *quadridentatus* Neumann, 1901:5, Fig. 13, 14.

*Hoplopleura* (?) *quadridentatus*, Kellogg and Ferris, 1915a:155.

*Hoplopleura quadridentata*, Ferris, 1916:156 (*partim*, not records from Galapagos).—Ferris, 1921:87, Fig. 52, 53 (*partim*, not records from *Oryzomys*).—Pratt and Lane, 1951:142, Fig. 4.—Ferris, 1951:127, 142 (*partim*).

The types of *quadridentata* were from *Nectomys squamipes* (as *Holochilus*), "Haut Peru." *H. quadridentata* has been recorded by Ferris from *Nectomys squamipes*, Paraguay: Sapucay, and from *N. squamipes palmipes*, Trinidad. Ferris also recorded the species from *Oryzomys melanotis rostratus*, USNM 92935, Mexico: Tamaulipas, Alta Mira, and *Oryzomys fulvescens*, USNM 58259, Mexico: Vera Cruz, Orizaba. The specimens from *O. fulvescens* are, in part, *H. similis* Kim and, in part, *H. uesoryzomydis* Ferris. I have not seen the specimens from *O. melanotis rostratus* but suspect they also may be *uesoryzomydis*. *H. quadridentata* was the typical anopluran parasite of *Nectomys squamipes palmipes* in Dr. Aitken's collections from Trinidad.

VENEZUELAN RECORDS

There were 33 females, 45 males, and 16 nymphs in 10 collections ex *Nectomys squamipes*, Bolivar, Monagas, T. F. Amazonas, and Zulia, including a single collection of 22 females, 22 males, and 5 nymphs (SVP 30781), T. F. Amazonas. One male was collected from *Holochilus brasiliensis* (SVP 13178) Monagas.

DIAGNOSIS

The Venezuelan specimens of *quadridentata* agree well with the description in Ferris (1921) except in the preantennal width, which depends upon position and flattening during mounting, and in that the Venezuelan females often lack setae off the abdominal plates. In the adult, *H. quadridentata* may be separated from related species by the marked rugosity or scabiness of head, thoracic, and major abdominal plates, in that the first antennal segment is normal, not enlarged, there are 1 long and 1 minute apical setae on paratergal plate

III; and there are 4 subequal apical lobes on paratergal plates III-VI, and 2 apical lobes on paratergal plate VII. The male genitalia are slightly longer, in proportion to their width than in other members of group except *H. multilobata* Werneck.

LENGTHS

Female, 1.1-1.25 mm; male, 1.05 mm.

REDESCRIPTION

MALE (Fig. 103): *Head* (Fig. 106). Dorsally rugose, anteriorly broadly rounded; posterolateral margins parallel, slightly convex; all dorsal setae except principal one very small to minute. *Thorax*. Well sclerotized dorsally, rugose or scaly; seta medial to mesothoracic spiracle long. Sternal plate (Fig. 105) triangulate anteriorly, posterior part rapidly narrowing to indented-truncate apex, posterolateral margins concave. *Abdomen*. Tergal plate of segment 1 present, lacking setae; typical terga (below third segment) each with 1 narrow, strongly sclerotized plate, posteromarginal setae slightly inflated medially. Typical sterna with 2 plates per segment, posteromarginal setae sword shaped. Sternal plates of segments 2-3 arranged as usual in genus. Paratergal plates (Fig. 107, female) scaly; II with 1 stout long apical seta; III with 1 long and 1 minute setae; IV-VI with 2 minute apical setae. Plates III-VI with dorsal and ventral apical lobes deeply and evenly subdivided, VII with 2 undivided apical lobes; VIII lacking lobes. *Aedeagus* (Fig. 104). With pseudopenis broadly flared, not angulate medially, serrate laterally; parameres broadest subapically, their apices recurved, acute.

FEMALE (Fig. 102): As male except for usual sexual dimorphism. Typical abdominal terga and sterna each with 3 narrow, well-sclerotized plates, their apical setae not strongly sword shaped or particularly inflated medially, none off plates. Genital plate entire but excavated laterally on each side; genital seta stout, long.

NYMPH (Fig. 101): *Third instar*. Principal dorsal head seta stout, short; other dorsal head setae very short, almost thornlike except lateral ones which are extremely minute. Head and thorax dorsally scaly. Three terminal setae on each side of abdomen; anal lobe somewhat prolonged. *Second instar*. Similar but smaller, with only 1 terminal seta per side. *First instar*. Not represented in the collections. The stoutness of the principal dorsal head seta together with the scabiness of head and thorax distinguish nymphs of *quadridentata* from others known in this group.

## DISCUSSION

*H. quadridentata* may serve as type of a group of species that occur in North, Central, and South America on species of the cricetine rodents *Oryzomys*, *Zygodontomys*, *Holochilus*, and *Nectomys*. The *quadridentata* group, a part of the *hesperomydis-affinis* complex, is characterized by the following: the thoracic sternal plate is prolonged posteriorly but always has the apex blunt or rounded, not acute; the antenna is not sexually dimorphic except the male often has the dorsal setae of segments 3-4 en-

larged. The most noticeable attribute is the tendency of the paratergal plates to have the apical lobes deeply subdivided so there are 4 subequal rounded or somewhat acute apical lobes, and, also, the apical setae of paratergal plates IV-VI are minute, and on plates II-III there is always at least 1 long seta. Abdominal setae of the typical segments vary from thin to sword shaped but are never as strongly flattened and broadened medially as in certain other groups of the genus. A tergal plate may be developed on the first abdominal segment

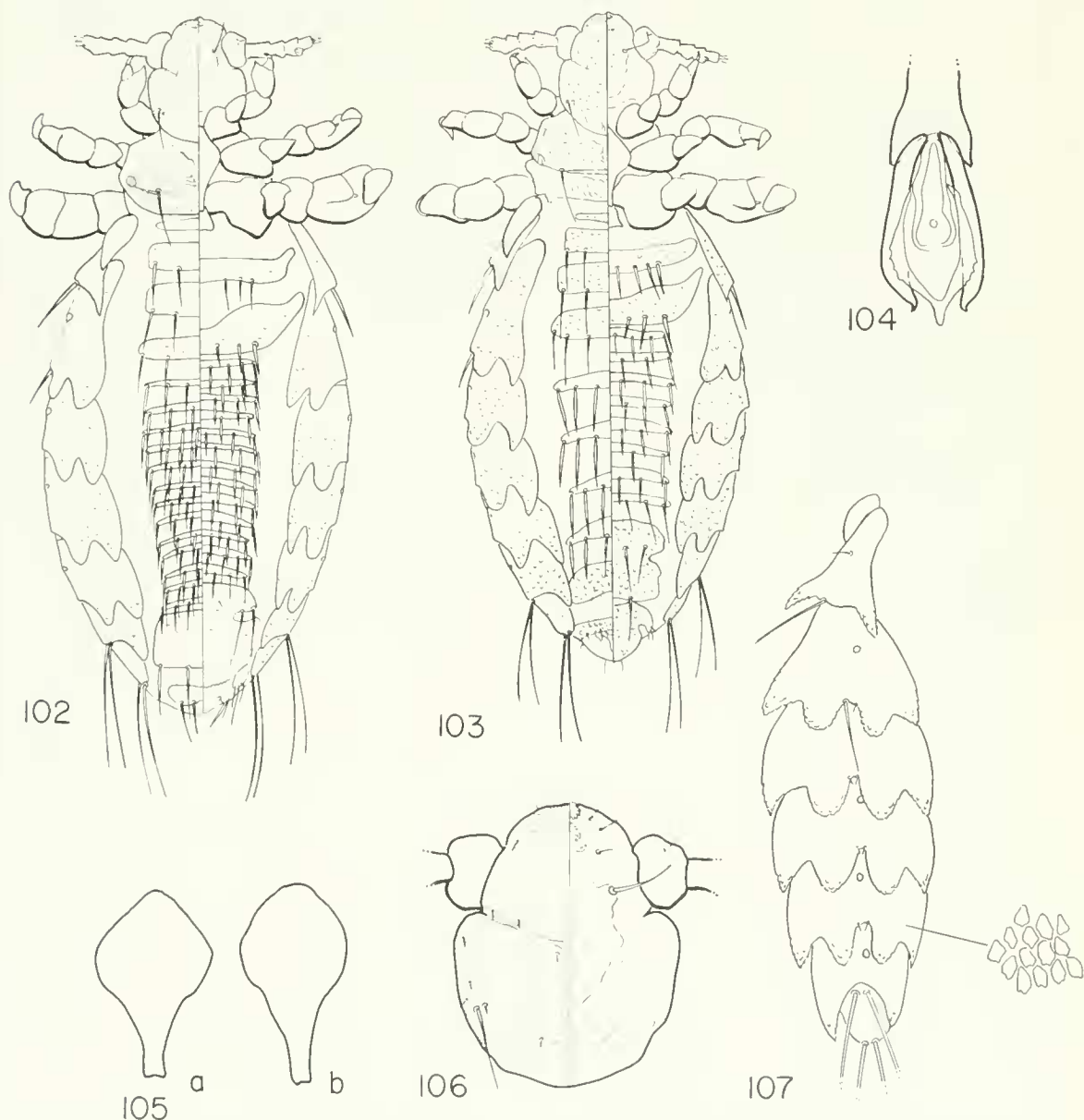


Fig. 102-107. *Hoplopleura quadridentata* (Neumann). Ex *Nectomys squamipes* (SVP 12429): 102, female; 103, male; 104, aedeagus; 105, thoracic sternal plate (a, male; b, female); 106, head, male. Ex *Nectomys squamipes* (SVP 30784): 107, paratergal plates, female.

but, if so, there are no setae on the posterior margin. The pseudopenis has a short posterior apex and the arms are serrate and flared medially. Nymphs have 1 or more terminal abdominal setae on each side, lack abdominal spiracles and any obvious abdominal segmentation, and the anal segment is never greatly prolonged. If all nymphs of this group are like that

of *oryzomydis* Pratt and Lane, which is known from all three stages (Cook and Beer, 1959), and that of *nesoryzomydis* Ferris, described in the present paper, the first stage has 2 terminal abdominal setae on a side; the second stage has only 1 such seta on each side, while the third stage has paired setae plus a single one on each side.

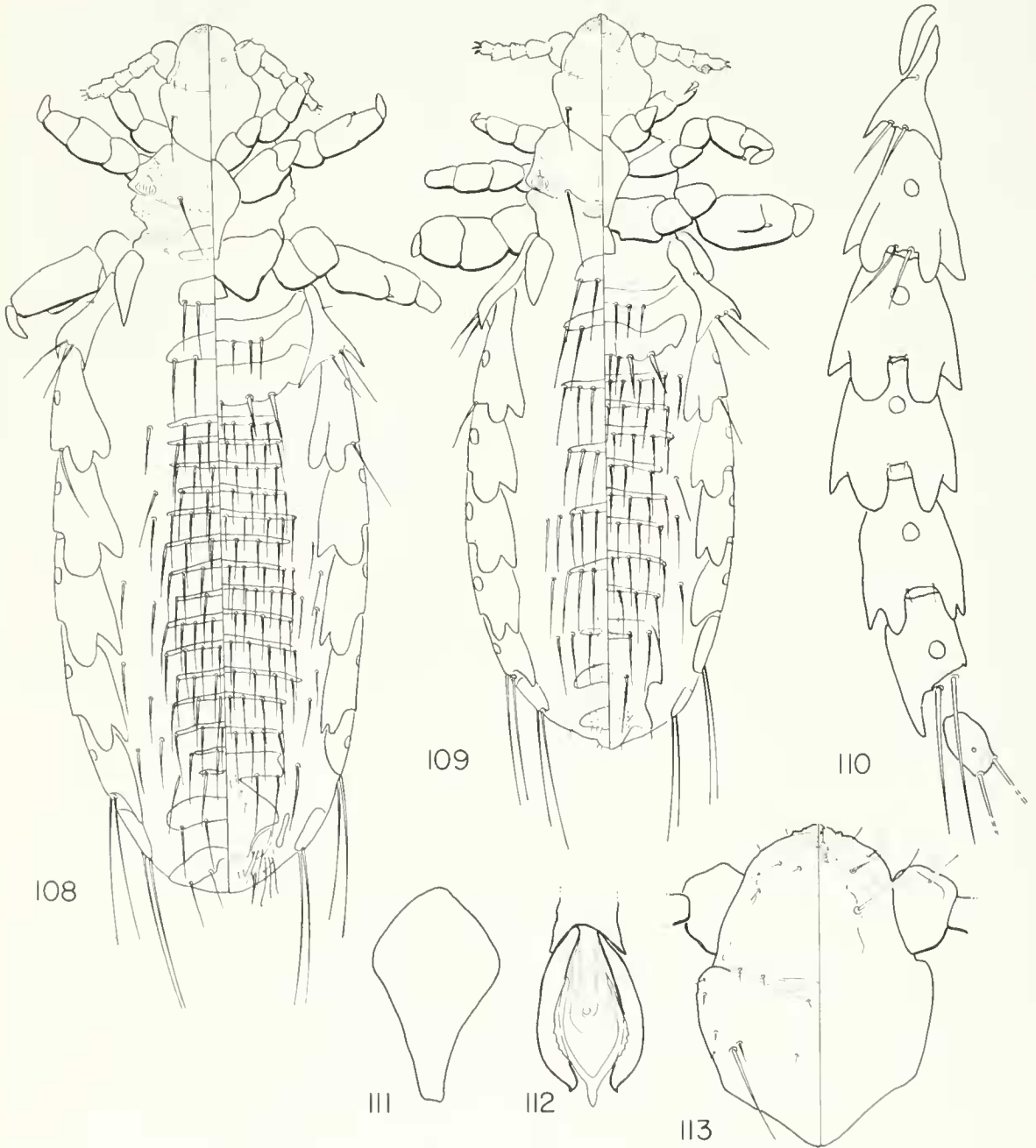


Fig 108-113. *Hoplopleura contigua*, new species, ex *Holochilus brasiliensis*. 108 allotype; 109, holotype; 110, parategital plates, female paratype, ex (SVP 3029); 111 thoracic sternal plate, female paratype, ex (SVP 3041); 112 aedeagus, holotype; 113, head, male paratype ex (SVP 3041).



14. *Hoplopleura contigua*, new species<sup>o</sup>

(Fig. 108-113)

TYPE DATA: Male holotype, female allotype, 1 female and 1 male paratypes ex *Holochilus brasiliensis* (SVP 3040), Venezuela: Trujillo, 30 km NW Valera (near El Dividive), 90 m elev., 2-X-65, Peterson team collectors; 1 female and 1 male paratypes (SVP 3041), as above; 3 female and 2 male paratypes (SVP 32310), as above but Carabobo, Montalbán, Potserito, 1091 m elev., 7-XI-67, Tuttle team collectors; 2 female and 4 male paratypes (SVP 12372), as above but Bolívar, 146 km S, 7 km E Ciudad Bolívar (Hato San José), 297 m elev., 27-II-67, Peterson team collectors; 1 male paratype (SVP 12376), as above but 1-III-67.

Also Examined: 1 male ex *Sigmodon hispidus* (SVP 32319), Carabobo, Montalbán, Potserito, 1091 m elev., 7-XI-67, Tuttle team collectors; 1 female (broken) ex *Holochilus brasiliensis* (SVP 43555), Monagas, 55 km SE Maturín, Mata de Bejuco, 18 m elev., 4-VI-68, Tuttle team collectors.

## DIAGNOSIS

A member of the *quadridentata* group. Separable from all known members of the group by a combination of having 2 long setae on both paratergites II and III; paratergite VII with a single, acute dorsoapical lobe; and plate VI with both apical lobes subdivided (Fig. 110).

## LENGTHS

Male holotype, 1.3 mm; female allotype, 1.55; female paratypes, 1.25-1.7; male paratypes, 1.1-1.4 mm.

## DESCRIPTION

MALE (Fig. 109): *Head* (Fig. 113). Rounded anteriorly, postantennal angles present, posterolateral margins slightly convex, convergent posteriorly; setation as in figure. *Thorax*. With posterior apex of sternal plate blunt or squared (Fig. 111, female); mesothoracic spiracle large, seta medial to spiracle long; dorsolateral portions of mesothorax rugose, slightly tuberculate. *Abdomen*. First tergum lacking plate and setae. One tergal and 2 sternal plates per typical segment; these narrow; apical setae of tergal plates flexible, elongate, slightly inflated medially; setae of venter similar; several setae off plates both dorsally and ventrally. Paratergal plates (Fig. 110, female) II-III with 2 long apical setae; plates IV-VI with apical lobes deeply subdivided, with 2 small, thin, but not minute, setae on each; plate VII with one acute apicodorsal lobe; plate VIII lacking lobes.

*Acdeagus* (Fig. 112). Elongate; pseudopenis with arms flared and rounded medially; apex narrow, short, extending only slightly beyond parameres.

FEMALE (Fig. 108): As male except for usual sexual dimorphism. Three narrow tergal and sternal plates per typical abdominal segment, their apical setae as in male; several setae off plates dorsally and ventrally. First abdominal tergum with poorly sclerotized plate; 1 small seta, off plate, to each side. Genital plate of eighth segment with small rectangular plate to each side. Genital seta elongate, not particularly stout and not flattened.

15. *Hoplopleura nesoryzomydis* Ferris<sup>o</sup>

(Fig. 114-128)

*Hoplopleura nesoryzomydis* Ferris, 1921:90, Fig. 53a.

*Hoplopleura quadridentata*, Ferris, 1921:88 (*partim*, one of specimens—a female—recorded from *Oryzomys fulvescens*, USNM 58259, Mexico: Vera Cruz).

*Hoplopleura nesoryzomydis*, Hopkins, 1949:471, 472.—Ferris, 1951:127, 138.—Pratt and Lane, 1951:142, Fig. 6.—Wenzel and Johnson, 1966:275.

The female holotype, male allotype, 6 female and 2 male paratypes were from a museum skin of *Oryzomys uarboroughi* (as *Nesoryzomys*), Galapagos Islands. Other paratypes were taken from a skin of *Oryzomys indefessus* (as *Nesoryzomys*), Galapagos Islands. Because of the large number of specimens obtained from these skins, accidental contamination probably was not involved. The Ferris Collection also includes a single female of *nesoryzomydis* from a skin of *Oryzomys fulvescens*, USNM 58259, Mexico: Vera Cruz, Orizaba. This specimen appears most like Venezuelan *nesoryzomydis*. In the same collection—all originally determined as *quadridentata* (Neumann) by Ferris—was included the type series of *H. similis* Kim. The record of two species of *Hoplopleura* from the same museum skin suggests that mechanical contamination may have taken place. Hopkins (1949) recorded *nesoryzomydis* from *Zygodontomys seorus*, *Callomys callosus* (as *Hesperomys venustus*), *Holochilus brasiliensis* (as *H. balnearum*, *H. sciureus*, and *H. volpinus*). *H. nesoryzomydis* is the typical anopluran parasite of *Zygodontomys brevicauda* in Trinidad, and in Panama it is common on *Z. brevicauda* (as *Z. cherriei*) and also occurs on *Oryzomys capito* (as *O. talamancae*).

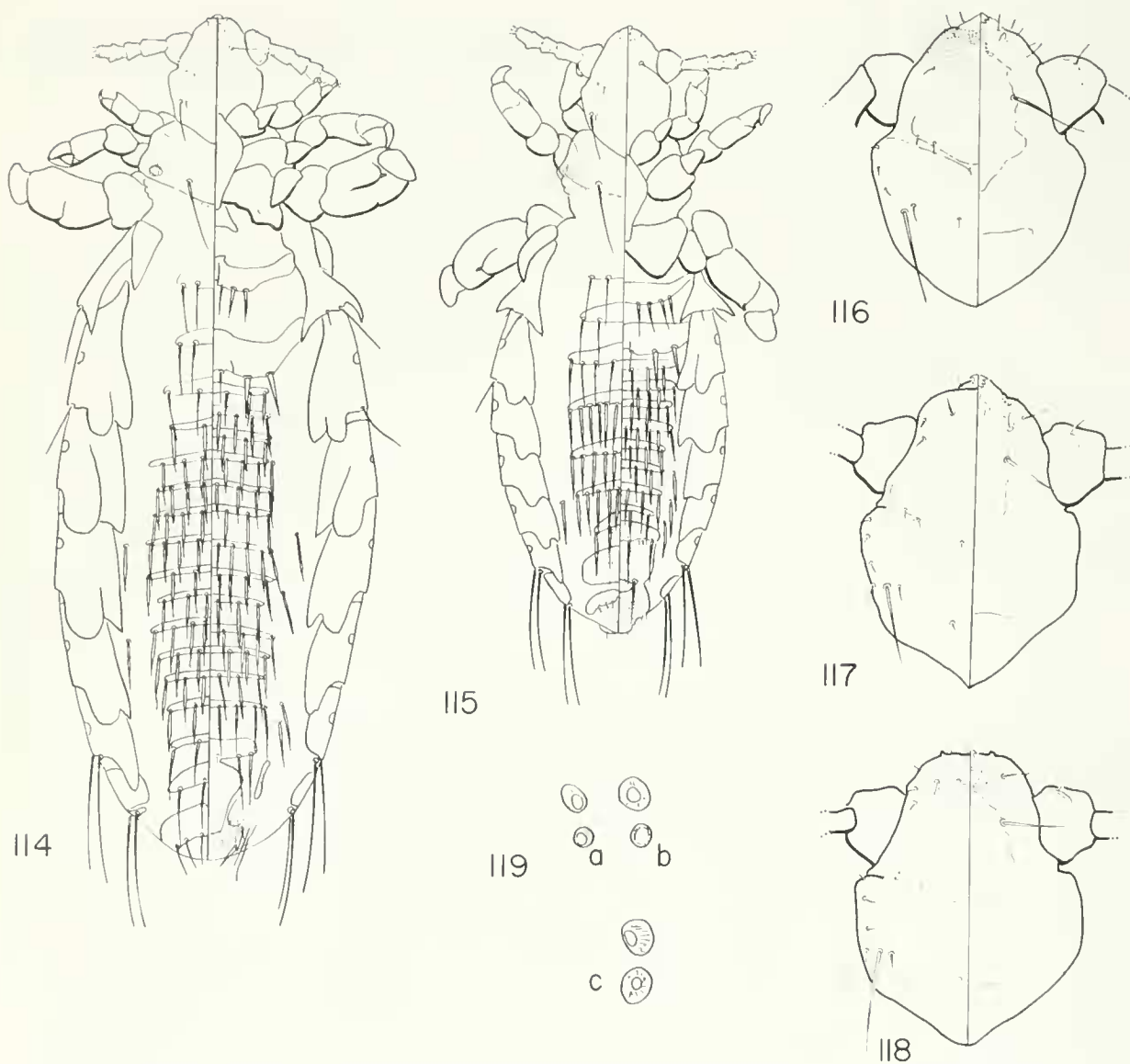


Fig. 114-119. *Hoplopleura nesoryzomydis* Ferris. 114, female, ex *Zygodontomys brevicauda* (SVP 3053); 115, male, same. Head, male: 116, allotype; 117, ex (SVP 3053); 118, Canal Zone, ex *Z. cherrii*, RML-43248; 119, spiracles of mesothorax (above) and paratergal plate III (below) (a, Canal Zone, ex *Z. cherrii*; b, Venezuela, ex *Z. brevicauda*; c, holotype).

#### VENEZUELAN RECORDS

This species is the typical anophuran parasite of Venezuelan *Zygodontomys*. Over 150 females, males, and nymphs in 126 collections were taken from *Zygodontomys brevicauda* from various localities in T. F. Amazonas, Apure, Bolivar, Carabobo, Falcon, Lara, Miranda, Monagas, Sucre, Trujillo, Yaracuy, and Zulia. *H. nesoryzomydis* also occurred in 2 collections ex *Oryzomys fulvescens*, 2 ex *Oryzomys minutus*, and 6 ex *Heteromys anomalus*. The *Oryzomys* collections could represent normal occurrence, and comment on the *Heteromys* infestations will be found under *Fahrenholzia schwartzi*.

#### DIAGNOSIS

A member of the *quadridentata* group. It may be separated in the adult from related spe-

cies by the combination of having 1 apical lobe on paratergal plate VII; 1 long and 1 minute setae on plate III, and paratergal plate VI with 2 apical lobes, the dorsal one being subdivided more or less deeply, and the ventral one with only a small indentation at most.

#### LENGTHS

Female, 1.2-1.4 mm; male, 1.0-1.1 mm.

#### REDESCRIPTION

**FEMALE** (Fig. 114): *Head* (Fig. 116-118, male). Preantennal area projecting, rounded; posterolateral margins slightly convergent posteriorly except when head flattened during

mounting; principal dorsal seta well developed, its accessory seta and other dorsal setae small but not minute. *Thorax*. Seta medial to mesothoracic spiracle very long. Sternal plate (Fig. 125-128) elongate, lateral angles rounded; apically truncate or slightly rounded. *Abdomen*. At times with indication of tergal plate on first segment. Usual arrangement of sternal plates and setae on segments 2-3; 3 tergal and 3 ster-

nal plates on typical segments, their apical setae sharply pointed but only slightly sword shaped; some setae off plates dorsally and ventrally. Paratergal plates (Fig. 120) II-III with 1 long and 1 short to minute apical setae (short seta missing on II in holotype); IV-VI with 2 short to minute apical setae; VII-VIII with usual pair of long setae. Plates III-VI with dorsal and ventral apical lobes, those of plate III

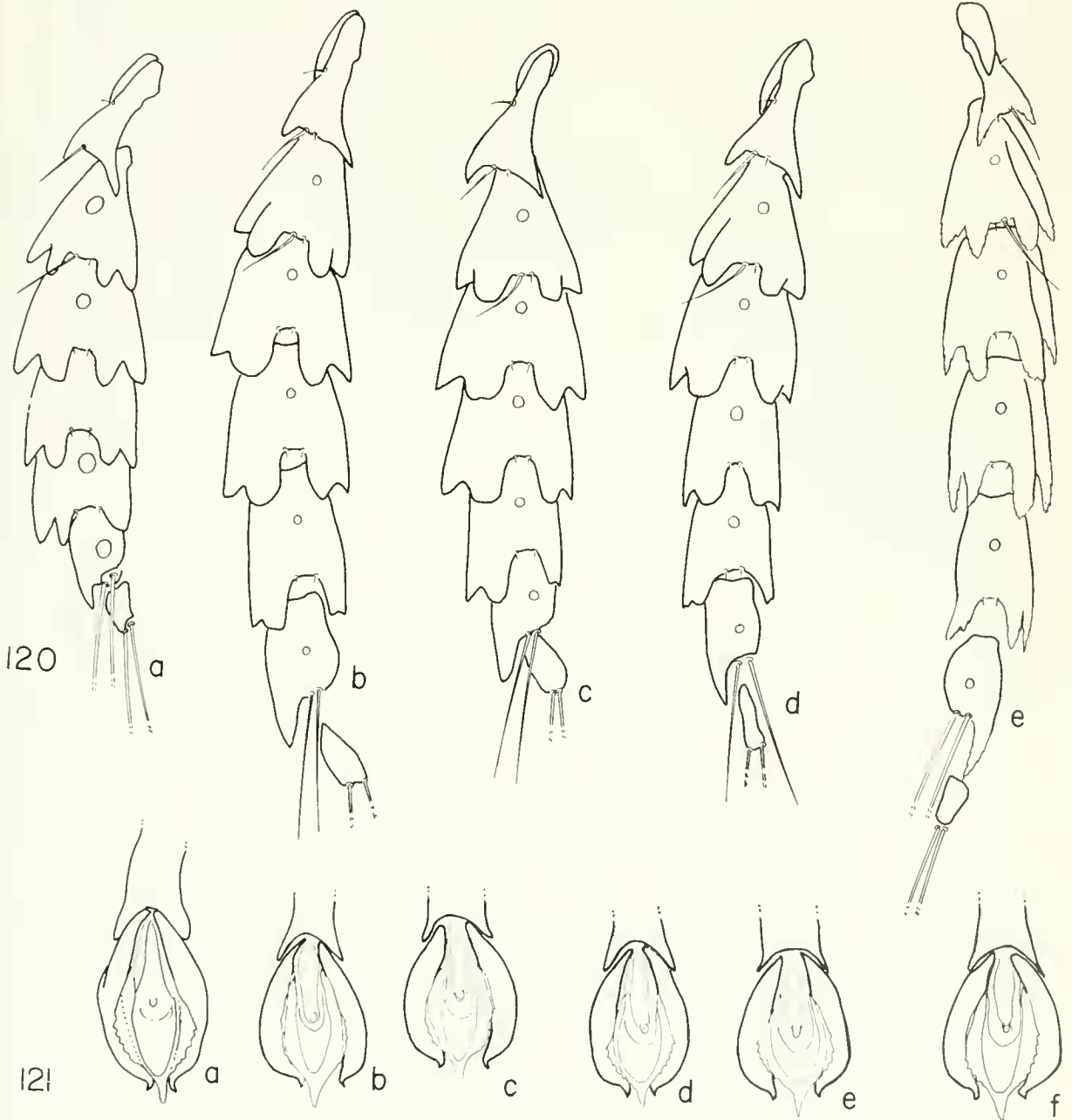


Fig. 120-121. *Hoplopleura nesoryzomydis* Ferris. 120 paratergal plates, female (a, holotype; b, Trinidad, ex *Zygodontomys brevicauda* TRVL-4577; c, Canal Zone, ex *Z. cherriei*, RML-44126; d, Venezuela, ex *Z. brevicauda* [SVP 3019]; e, female, Menocucho, Peru, ex *Oryzomys xanthocolus*, FCM-19431); 121, aedeagus (a, allotype; b, c, and d, Venezuela, ex *Z. brevicauda* [SVP 3053, SVP 10942, and SVP 25557]; e, Canal Zone, ex *Z. cherriei*, RML-43248; f, Trinidad, ex *Z. brevicauda*, TRVL-4577).

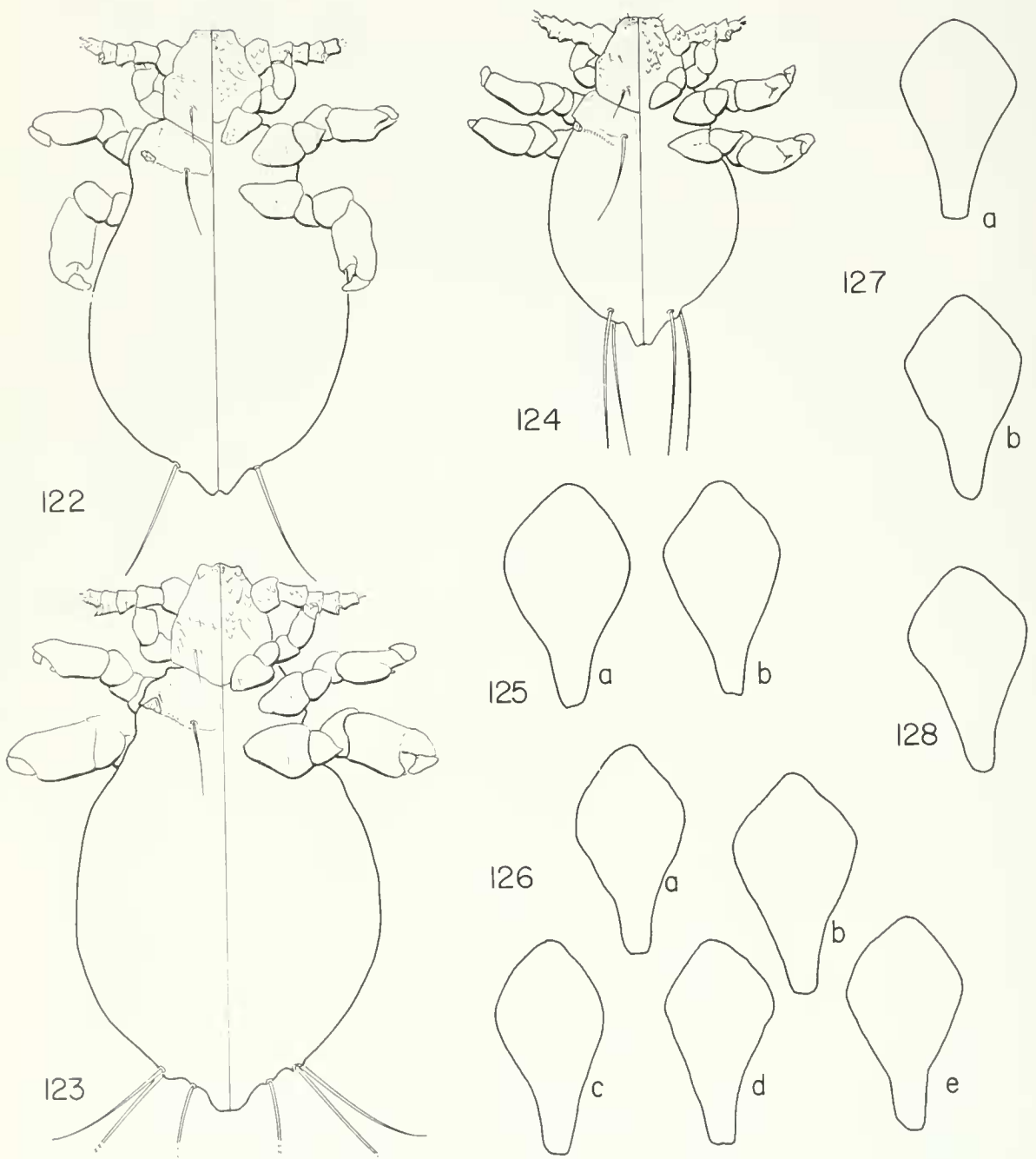


Fig. 122-128. *Hoplopleura nesoryzomydis* Ferris. 122, nymph, second instar, Trujillo, ex *Zygodontomys brevicauda* (SVP 3090); 123, same, third instar; 124, same, first instar, Miranda, ex (SVP 10949). Thoracic sternal plate; 125, Trinidad, ex *Z. brevicauda*, TRV1-4577 (a, female; b, male); 126, Venezuela, ex *Z. brevicauda* (a, male, Trujillo, ex V-3053, b, same, female; c, male, T. F. Amazonas, ex [SVP 25557]; d, male, Miranda, ex [SVP 10942]; e, female, same); 127 (a, female holotype; b, female, ex *Oryzomys xanthocolus*, Peru, Menocucho, FCM-19131); 128, male, Canal Zone, ex *Z. cherriei*, RML-43248.



strongly subdivided; those of IV-VI succeeding less so; plate VII with one dorsal lobe; plate VIII lacking apical lobes. Genital plate joined only medially; genital seta long, not flattened.

**MALE** (Fig. 115): As female except in usual sexually dimorphic features. Abdominal plates as usual: 2 sternal and 1 tergal plates per typical segment, their apical setae long, slender, not sword shaped. *Aedeagus* (Fig. 121). With parameres expanded posteriorly, pseudopenis apically acute; lateral arms serrate, not strongly angled medially.

**NYMPH** (Fig. 122-124): *Third stage* (Fig. 123). With head and thorax not markedly rugose or scaly dorsally; principal dorsal head seta not especially stout; lateral and median dorsal head setae neither minute nor thornlike. One pair and a single terminal abdominal setae on each side. *Second stage* (Fig. 122). Like third except only 1 terminal abdominal seta per side. *First stage* (Fig. 124). With 1 pair of terminal abdominal setae on each side, very long dorsal mesothoracic seta.

#### DISCUSSION

Whether the observed variation depends on geographic or host factors, or a combination of both, remains to be seen. Head shape is similar in all specimens, the slight differences seen probably are due to position and flattening during mounting (compare Fig. 116-118). Variation of the shape of the thoracic sternal plate in Venezuelan specimens appears to equal that seen in specimens from all the other localities (compare Fig. 125-128). The type series, ex *Oryzomys narboroughi*, is of like size and is otherwise similar to the Venezuelan forms except that the abdominal spiracles are larger (compare Fig. 119a-c); the abdominal setae are more sword shaped in the type series, and the apicodorsal lobe of paratergal plate VII is not as long as in the Venezuelan specimens. *H. nesoryzomydis* from Panama is similar to that from Venezuela. *H. nesoryzomydis* from Trinidad has the abdominal setae as sword shaped as in the type series, but the abdominal spiracles are small. The male genitalia of all are similar except the allotype has the parameres evenly rounded laterally rather than expanded apically (compare Fig. 121a-f).

The single female Ferris recorded from *Oryzomys xanthocolus*, FCM 19431, Peru: Menocuelio, has small abdominal spiracles; the thoracic sternal plate (Fig. 127b) is narrower than in typical *nesoryzomydis*, and the apical lobes of the paratergal plates are narrower, longer, and scaly (Fig. 120e). There also are more

setae off the abdominal plates. The abdominal setae are like the types of *nesoryzomydis* in their being shorter and more sword shaped than in specimens from other hosts and localities. I have seen a second female, ex *Oryzomys xanthocolus*, Peru: Piura, La Arena (Field Museum of Natural History), that has paratergal plates and other characters as the Peruvian female from the Ferris Collection.

The male recorded by Ferris (1921) ex *Oryzomys angouya*, FCM 18167, Paraguay: Sapucay, may be a different species. It has the apical setae of paratergal plates II-III short, barely exceeding the apices of the lobes, paratergal plate VI has a single dorsal lobe, and plate VII lacks apical lobes. The male genitalia are similar but somewhat longer than in typical *nesoryzomydis*.

#### 16. *Hoplopleura oryzomydis* Pratt and Lane<sup>\*</sup> (Fig. 129-137)

*Hoplopleura oryzomydis* Pratt and Lane, 1951: 141, Fig. 1-3.—Cook and Beer, 1959:409, Fig. 11, 20, 26.

The female holotype and male allotype were from *Oryzomys palustris palustris*, USA: Georgia. Many paratypes were taken from the same host and locality as well as from *O. p. palustris* and *O. p. coloratus* in Delaware, South Carolina, and Florida. It has also been recorded from *O. palustris*, USA: Louisiana. I have seen paratypes from Florida.

#### VENEZUELAN RECORDS

Two females, 4 males, and 1 nymph, apparently of this species, were collected from *Nectomys alfar* (SVP 22790), Zulia. 3 km S, 19 km W Machiques (Novito).

#### DIAGNOSIS

A member of the *quadridentata* group. *H. oryzomydis* can be separated from other species of this group by a combination of its having only one apical lobe on paratergal plate VII; both apical lobes of plate VI equally and deeply subdivided; and with 1 long and 1 minute apical setae on plate III (Fig. 131).

#### LENGTHS

Female, 1.3-1.35 mm (USA paratypes, 1.3-1.45 mm); male, 1.0-1.05 mm (USA paratypes, 1.2 mm).

#### DISCUSSION

The differences between North American *oryzomydis* and the Venezuelan specimens are so slight that there is no salient reason for assuming on morphological grounds that the South American form represents a different

species. Adults from the Venezuelan collection are similar to paratypes from Florida, except that the Venezuelan females have 3 or 4 setae on the tergal plate of abdominal segment 8 rather than 2 (Fig. 129) and there are fewer setae ventrally off the abdominal plates. Heads of the two forms are similar (Fig. 132, 133). The shape of the aedeagus of Venezuelan males ap-

proximates that of the male illustrated by Pratt and Lane, but in the paratypes I examined the parameres were less convex (Fig. 136a). These slight differences probably depend somewhat on positioning of the parts. The nymphal third instar (Fig. 134) has 1 pair plus 1 long seta per side instead of 1 pair of long setae and 1 pair consisting of 1 long and 1 small setae—as shown by

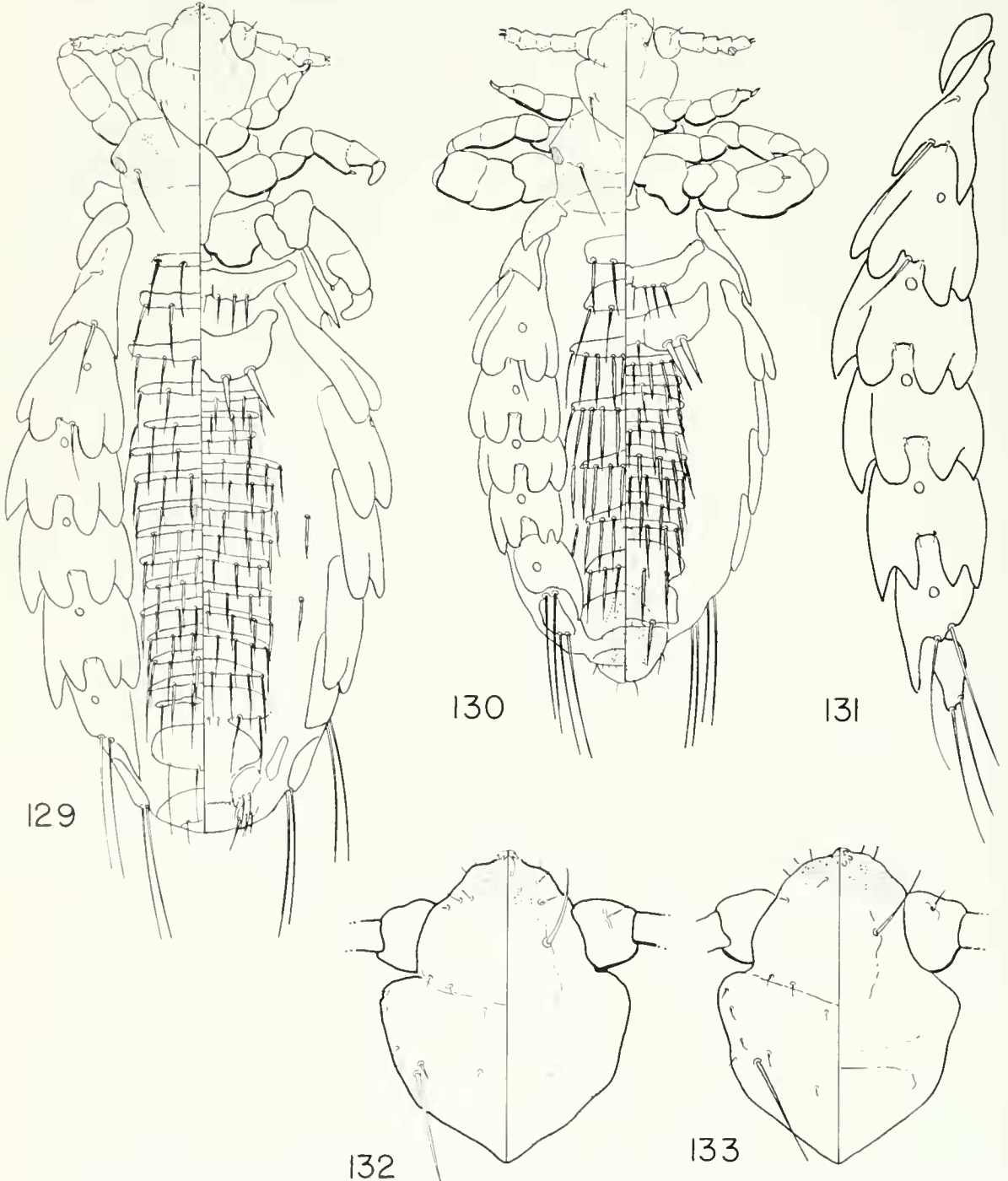


Fig. 129-133. *Hoplopleura oryzomyidis* Pratt and Lane. 129, female, ex *Nectomys alfar* (SVP 22790); 130, male same; 131, paratergite, female, same; 132, head, male, same; 133, head, male, paratype, Florida.

Cook and Beer (1959), but not described by Pratt and Lane in their original description of *oryzomydis*. Also, in the Venezuelan nymphs, the dorsolateral head setae are fine and very small; whereas in Cook's and Beer's Fig. 26, these setae are drawn as being relatively well developed.

17. *Hoplopleura multilobata* Werneck,  
sensu lato<sup>o</sup>  
(Fig. 138-145)

*Hoplopleura multilobata* Werneck, 1954:109,  
Fig. 1, 3-5.

The unique female holotype was recorded as being from *Proechimys iheringi*, Brazil: State of Espírito Santo.

#### VENEZUELAN RECORDS

The specimens, provisionally assigned here to *H. multilobata* Werneck, are the first mentioned since the original description. There were 50 collections, containing 97 females, 40 males, and 16 nymphs from *Oryzomys albigularis*, from various localities in Dto. Federal, Trujillo, Merida, and Tachira; 4 collections of 5 females, 3 males, and 3 nymphs ex *Oryzomys minutus* (SVP 3930, 4557, 3972, 4221), Merida; 1 nymph from *Oryzomys concolor* (SVP 716), Dto. Federal; and 4 collections of 6 females and 1 male ex *Heteromys anomalus* (SVP 1011, 1036, 1040, 14621), Dto. Federal and Sucre.

I have also examined 3 females, in 2 collections, from *O. albigularis*, Colombia: Department of Cauca, Munchique (no. 1806) and Department of Valle (no. 1385), H. Trapido collector, Rockefeller Foundation.

#### DIAGNOSIS

*H. multilobata* is easily distinguished from other known South American species of *Hoplopleura* by the greatly enlarged first antennal segment (Fig. 145). This species is most closely related to the *quadridentata* group, departing from this group by having only 1 minute seta on paratergal plate III rather than at least 1 long seta in this position. The male genitalia are similar but more compressed and elongate (Fig. 142). Setation of the terminal segments of the nymphal abdomen agrees with that of the *quadridentata* group.

#### LENGTHS

Female, 1.3-1.4 mm; male, 1.0 mm.

#### REDESCRIPTION

**FEMALE** (Fig. 140): *Head* (Fig. 145, male). Flattened apically; posterolateral margins parallel, straight; principal dorsal seta long, stout, its accessory seta short but stout; other dorsal seta minute. First antennal segment much enlarged, broader than long. *Thorax*. Mesothoracic seta long. Sternal plate (Fig. 144) prom-

inent, very well sclerotized, apically truncate, more than one and one-half times as long as broad, posterolateral margins somewhat concave. *Abdomen*. Tergal and sternal plates well developed, enlarged setae on first sternal plate of segment 3 not much larger than other setae on this plate; 3 tergal and 3 sternal plates per typical segment, their apical setae elongate, thin, not sword shaped; no setae off plates. Paratergal plates (Fig. 143) III-VII with rounded dorsal and ventral apical lobes, these secondarily divided, usually 2 or more of these plates have the secondary lobes further divided. Plate II with 2 long apical setae; plate III with 1 minute seta; plates IV-VI with 1 minute marginal seta and 1 minute seta on the dorsal face of the plate; plates VII-VIII with usual pair of long apical setae. Genital seta medium sized, not very thickened.

**MALE** (Fig. 141): As female except in usual sexually dimorphic characters. *Abdomen* with 2 sternal and 1 tergal plates per typical segment; all these well developed; apical setae of tergal plates elongate and inflated medially; setae of sternal plates slightly sword shaped; no setae off plates. *Aedeagus* (Fig. 142). With shape of parameres depending on position; parameres and pseudopenis elongate, apically acute; pseudopenis flared medially, margins serrate distad to flare.

**NYMPH** (Fig. 138, 139): All instars with enlarged first antennal segment; antennal segments 3-5 with strong posteriorly directed setae dorsally; minute dorsolateral head setae; principal dorsal head seta stout, especially in third instar, this seta accompanied by small, stout accessory seta. Second and third instars similar except that third instar (Fig. 139) with 3 terminal abdominal setae per side, and second instar with 1 terminal seta per side. First instar (Fig. 138) with 2 terminal abdominal setae on each side; dorsal thoracic seta very long.

#### DISCUSSION

Considering the disparity in hosts and geographical distribution (*Oryzomys albigularis*, a myomorph, is primarily Andean and does not extend to the Brazilian coast where holotypic *multilobata* supposedly was taken from *Proechimys*, a hystricomorph), I have strong reservations concerning identity of holotypic *multilobata* with the Venezuelan specimens. However, in the absence of obvious morphological differences, without examination of the holotype of *multilobata*, and considering the possibility of erroneous host association of that holotype, it is impossible to assume that the

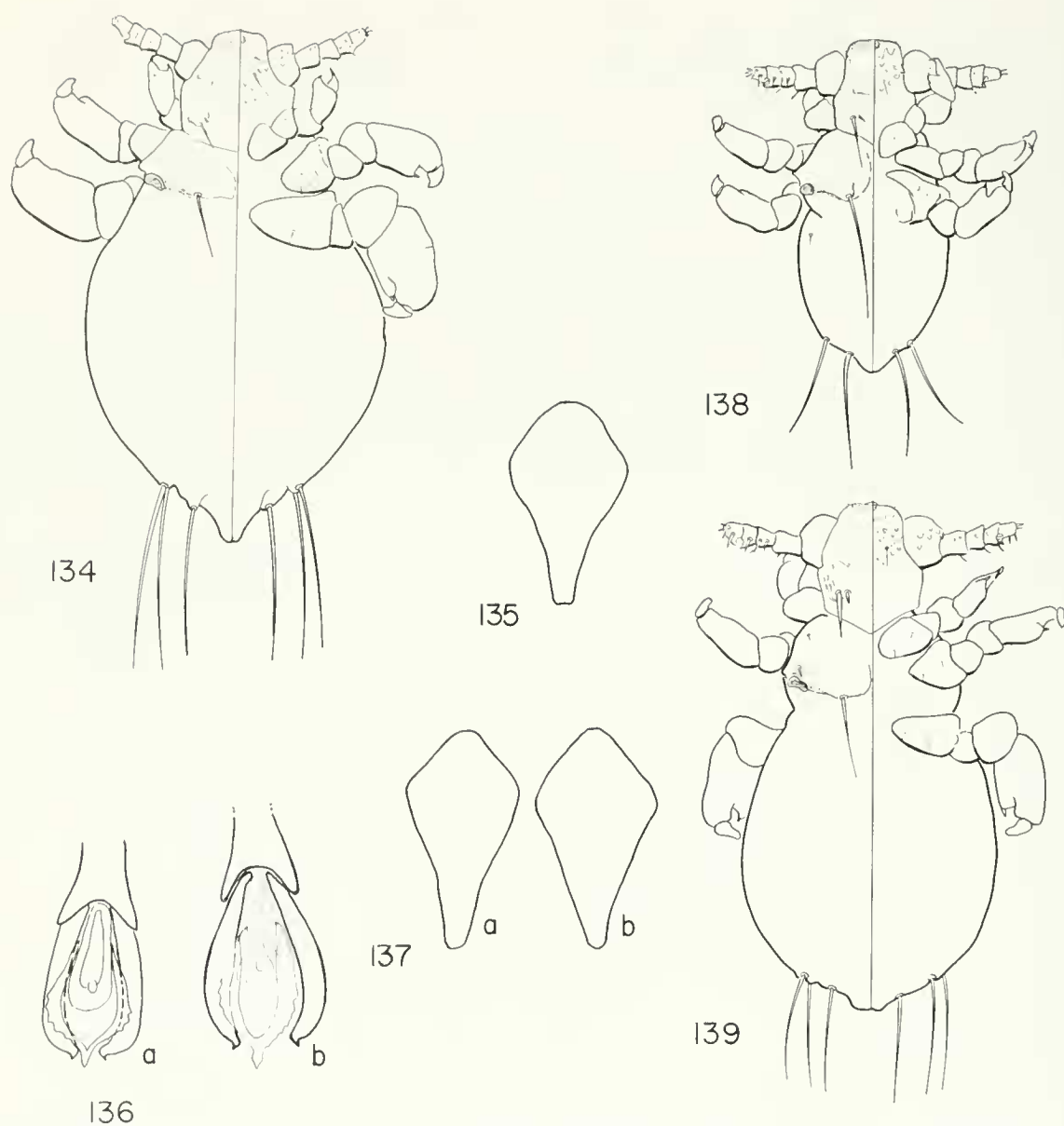


Fig. 134-139. *Hoplopleura quadridentata* group. 134, *H. oryzomydis* Pratt and Lane, nymph, third instar, ex *Nectomys alferi* (SVP 22790); 135, same, thoracic sternal plate, male, ex (SVP 22790); 136, same aedeagus (a, paratype, Florida; b, Venezuela, ex [SVP 22790]); 137, same, thoracic sternal plate, paratypes, Florida (a, male; b, female); 138, *H. multilobata* Werneck nymph, first instar, Dto. Federal, ex *Oryzomys albicularis* (SVP 3713); 139, same, third instar.

Venezuelan specimens belong to a different species. The present series agrees quite well with the original description of *multilobata*, except the apical lobes of the paratergal plates are not so strongly subdivided, usually having only 2 or 3 marked secondary lobules (Fig. 143) rather than the 6-8 occurring in the type female. Seta-tion of the paratergal plates may be as in the holotype. Although Werneck pictured only a single minute apical seta on plates IV-VI, the second apical seta of these plates is very small

and, being removed from the margin, could easily be overlooked. The thoracic sternal plate is as in holotypic *multilobata*.

18. *Hoplopleura scapteromydis* Ronderos  
(Fig. 146-152, 156)

*Hoplopleura scapteromydis* Ronderos, 1965:46,  
Fig. 1-3.

The unique female holotype was from *Scap-teromys tumidus* (as *S. tumidus aquaticus*). Ar-



gentina: Province of Buenos Aires, Castelli. Since the host of *scapteromydis* does not occur in Venezuela, it would not be expected to occur there. However, the male and nymph have not been described, and the relationship of this southern species to the *quadridentata* group adds to our understanding of the supraspecific relationships in the genus *Hoplopleura*.

#### NEW RECORDS

There were 86 females, 54 males, and 21 nymphs of the second and third instar in more than 25 collections ex *Scapteromys* sp., Urugu-

ay: Departments of Soriano, Trinta y Tres, and Maldonado (American Museum of Natural History).

#### DIAGNOSIS

Close to *H. fonsecai* Werneck and *H. oxymycteri* Ferris. Separable from all other South American *Hoplopleura* species by the combination of having the thoracic sternal plate prolonged posteriorly and with a blunt apex; apical setae of paratergal plates II-III normal, not thickened or apically hooked; plate III with the apical lobes broad and apically angled; plates

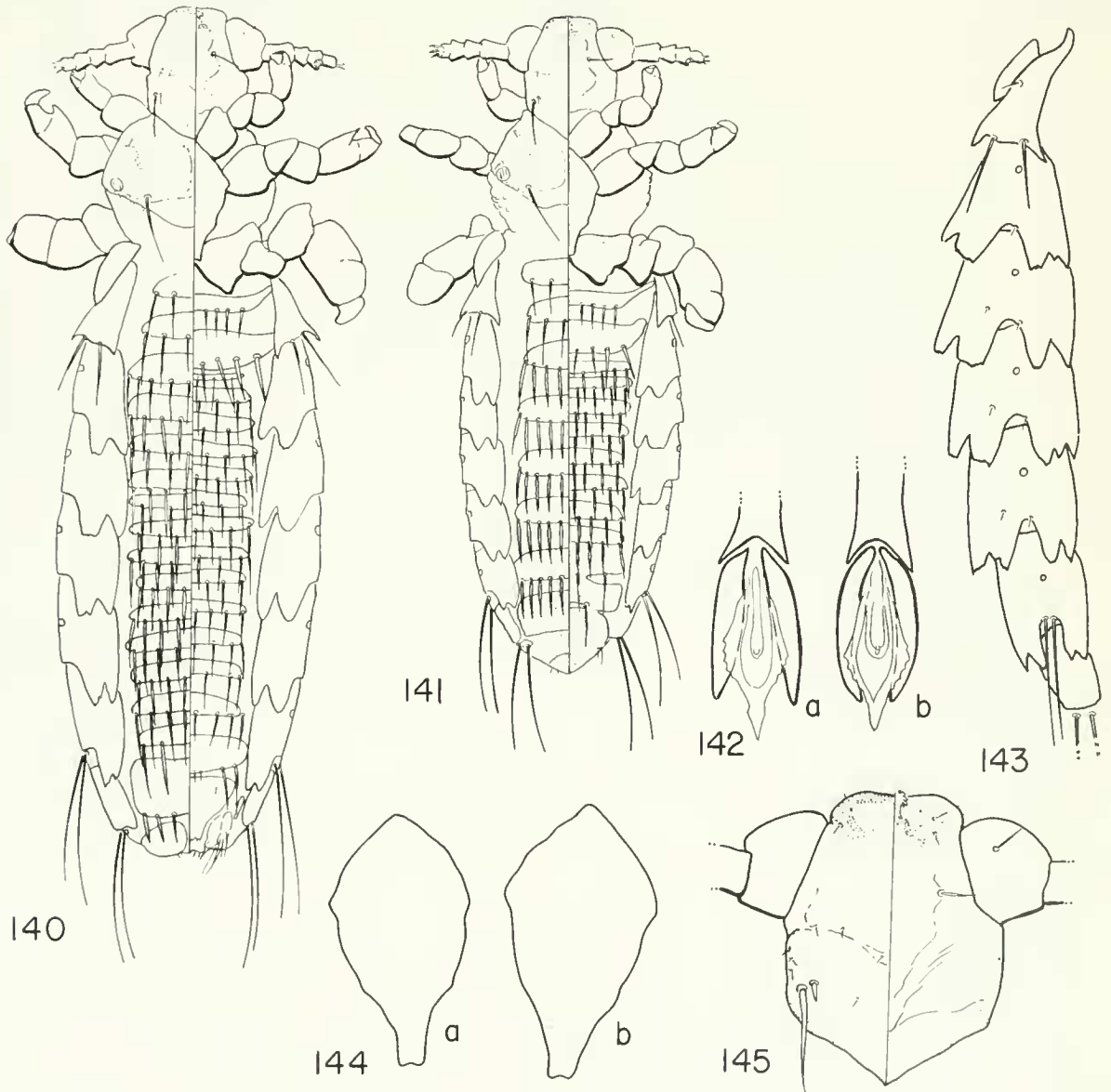


Fig. 140-145. *Hoplopleura multilobata* Werneck, ex *Oryzomys albicularis*. 140, female, Trujillo, ex (SVP 3896); 141, male, same; 142, aedeagus (*a*, Merida, ex [SVP 4566]; *b*, Trujillo, ex [SVP 3896]); 143, paratergal plates, female, Trujillo, ex (SVP 3896); 144, thoracic sternal plate, ex (SVP 3896) (*a*, male; *b*, female); 145, head, male, ex (SVP 3896).

IV-VI with acute apical angles, the dorsal one subdivided; and lacking apical lobes on plates VII-VIII (Fig. 156).

#### LENGTHS

Female, 1.2-1.45 mm; male, 0.95-1.1 mm.

#### REDESCRIPTION

**MALE** (Fig. 147): *Head* (Fig. 150). Anteriorly flattened; one of anteroventral setae longer than usual in genus, and usually projecting at right angles from head; dorsolateral setae minute; principal dorsal seta stout, its accessory seta minute; postantennal angles pronounced; posterolateral head margins slightly

convex and posteriorly convergent. *Thorax*. With long, dorsal mesothoracic seta. Sternal plate (Fig. 152, female) subrounded anteriorly, posteriorly prolonged, apex blunt, even slightly concave. *Abdomen*. One tergal and 2 sternal plates per typical segment, these thin, sometimes incomplete dorsally; 1 lateral seta well removed from each tergal plate on segments 6-7 and often 4-5; ventrally 1 lateral seta per segment off plates. Abdominal setae elongate, little or not at all inflated, not sword shaped. Sternal plates of segments 2-3 as usual in genus. Paratergal plates (Fig. 156, female) with II having 2 setae longer than acute apical

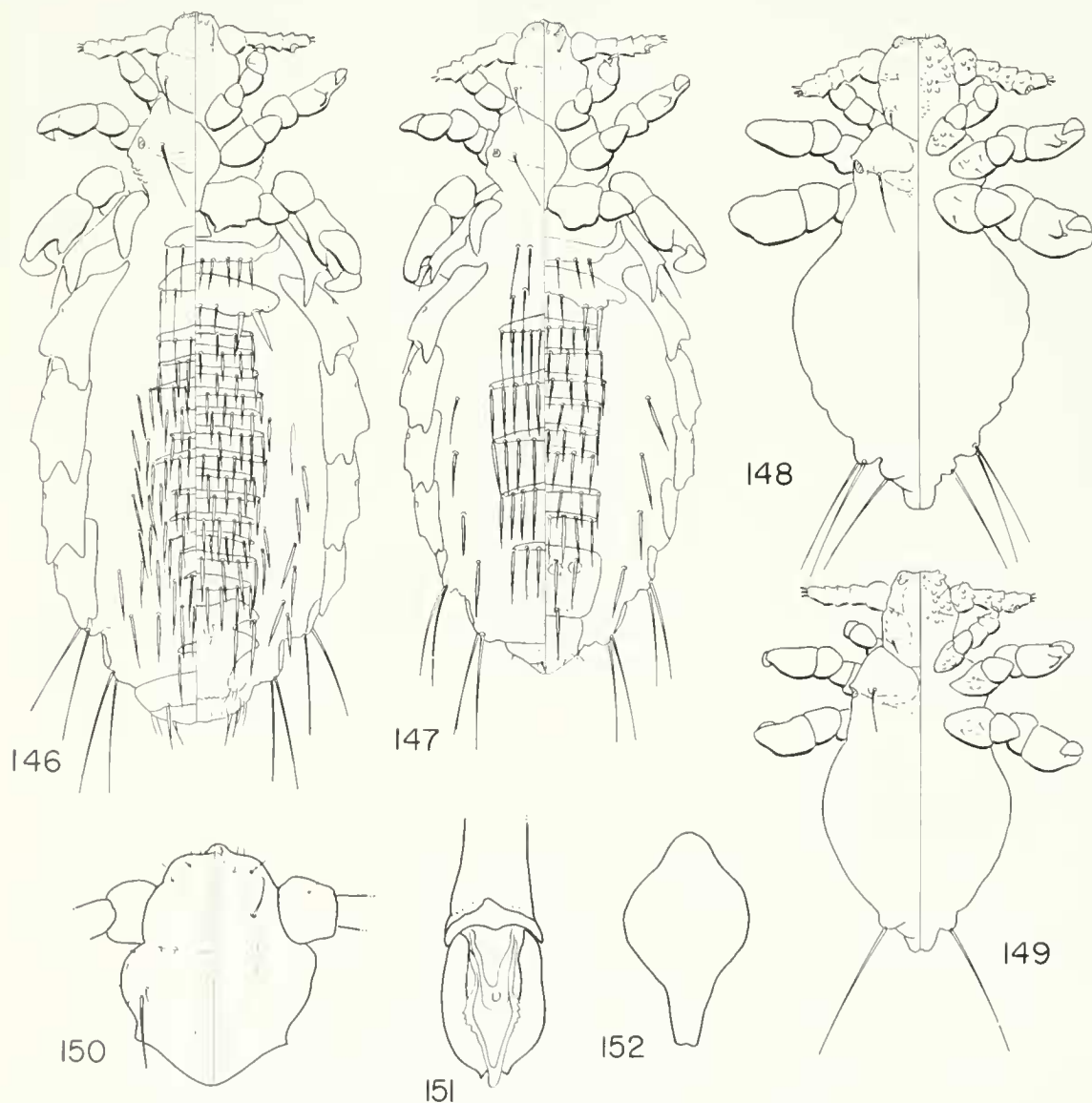


Fig. 146-152. *Hoplopleura scapteromydis* Ronderos, Uruguay, ex *Scapteromys* species. 146, female, Dept. Maldonado, AMNH-206252 -56, -57; 147, male, same; 148, nymph, third instar, same; 149, nymph, second instar, same; 150, head male, same; 151, aedeagus, same; 152, thoracic sternal plate female, Dept. Soriano, ex AMNH-206298-308

lobes; plate III with 1 apical seta exceeding acute apical lobes, other seta small; plates IV-V with dorsoapical lobe secondarily subdivided into 2 acute points, ventral lobe either with small indentation or merely undulate apically; plate VI with dorsoapical lobe sometimes subdivided, apical lobe poorly developed, subrounded to acute. Setae on plates IV-VI variously developed,

always small to minute, sometimes apparently lacking. Plates VII-VIII lacking apical lobes, with usual 2 long apical setae. *Aedeagus* (Fig. 151). Has pseudopenis somewhat flared medially, slightly serrate laterally, apex short, extending only slightly beyond parameres; parameres acute apically.

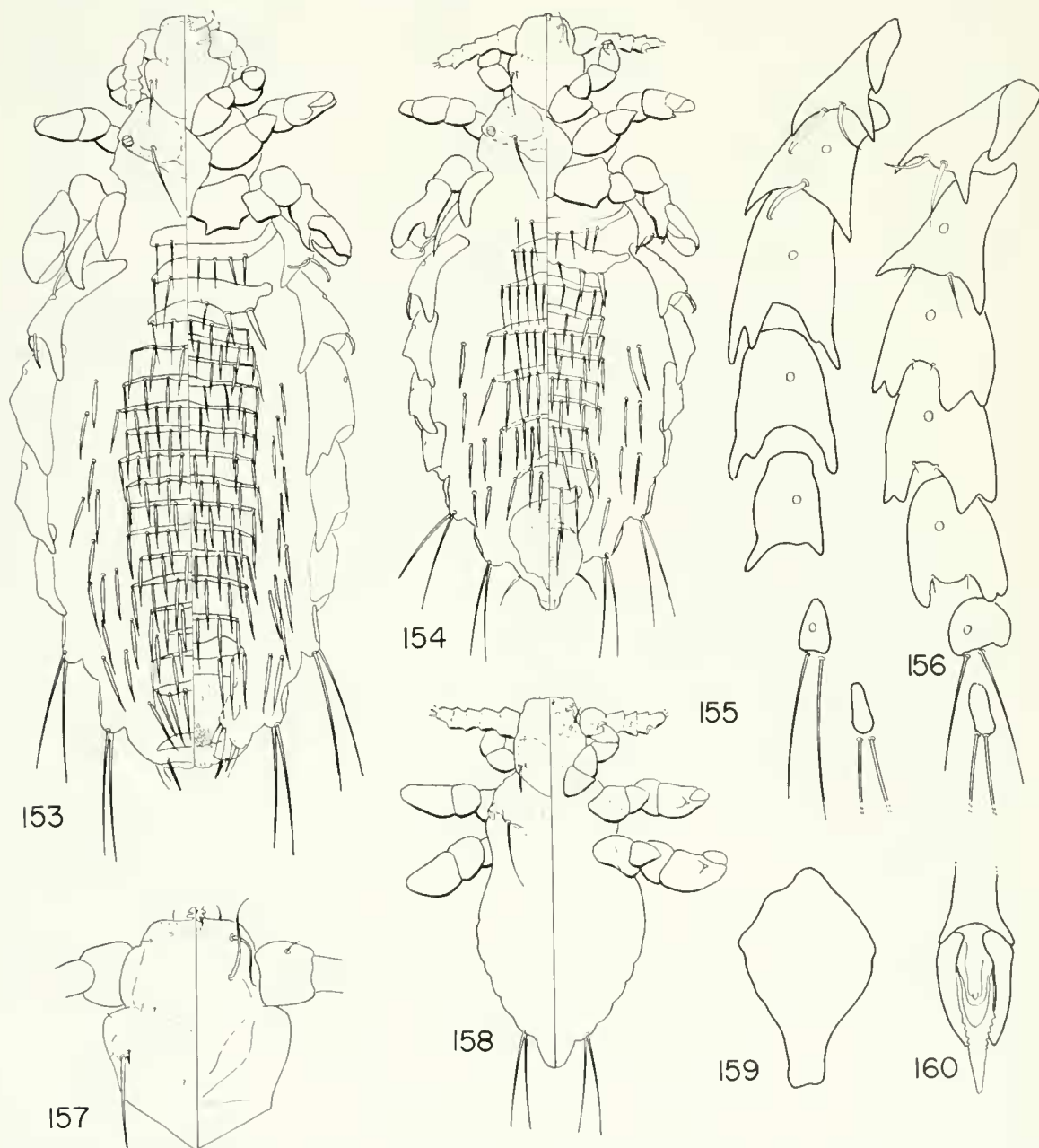


Fig. 153-160. *Haplopleura* species. 153. *H. fonsecai* Werneck, female, Uruguay, ex *Oxymycterus rufus nasutus*, AMNH-206196; 154, same, male, ex *O. r. nasutus*, AMNH-206193. 155, same, paratergal plates, female, ex *O. r. nasutus*, AMNH-206196; 156. *H. scapteromydis* Ronderos, paratergal plates, female, Uruguay, ex *Scapteromyia* species, AMNH-206298-308. 157. *H. fonsecai*, head, male, ex *O. r. nasutus*, AMNH-20693; 158. same, nymph, second instar, ex *O. r. nasutus*, AMNH-206195; 159 same, thoracic sternal plate, female, AMNH-206196; 160, same, aedeagus, AMNH-206193.

**FEMALE** (Fig. 146): As male except for sexually dimorphic characters. Tergal plates of abdomen often strongly reduced and incomplete; lateral setae off abdominal plates both ventrally and dorsally. Paratergal plates (Fig. 156) with apical lobes of IV-V more strongly subdivided than in male; plate VI with dorsal lobe subdivided, ventral lobe undivided, acute. Genital seta elongate, not flattened.

**NYMPH** (Fig. 148, 149): Ventral head tubercles rounded, principal dorsal head seta short, stout; other dorsal setae of head minute. One anteroventral head seta on each side elongate, as long as principal ventral head seta. *Third instar* (Fig. 148). With 3 terminal abdominal setae per side arranged as a pair and a single; indication of segmentation of abdomen; anal segment slightly prolonged. *Second instar* (Fig. 149). As third except with a single terminal abdominal seta on each side. *First instar*. Unknown.

#### DISCUSSION

A definite relationship with the *quadridentata* group is shown by the shape of the thoracic sternal plate; lack of large setae on the plate of the first abdominal tergum; the tendency toward deep subdivision of the apical lobes of the paratergal plates, and their setation; and the setation of the terminal abdominal segments of the nymph. However, its closest relatives appear to be *H. fonsecai* Werneck, also discussed in this paper, and *H. oxymycteri* Ferris, from Peruvian *Oxymycterus paramensis*. These 3 species occupy a somewhat isolated and intermediate position between *quadridentata*-group species and forms related to *H. alata* Ferris.

#### 19. *Hoplopleura fonsecai* Werneck

(Fig. 153-155, 157-160)

*Hoplopleura fonsecai* Werneck, 1934:412, Fig. 7-12.—Hopkins, 1949:471. — Ferris, 1951:128, 136.—Ronderos and Capri, 1965:38. — Ronderos, 1965:48, 50. — Ronderos and Capri, 1966:97.

The female holotype, male allotype, 4 female and 1 male paratypes, and an unstated number of nymphs were taken from the ericetine *Oxymycterus judex*, Brazil: State of Santa Catarina, Humboldt. Ronderos and Capri (1965) recorded 4 females and 4 males ex *Oxymycterus rufus platensis* (as *O. rutilans platensis*), Argentina: Province of Buenos Aires. I have studied 3 collections of this species, all ex *Oxymycterus rufus nasutus*, Uruguay: Depart-

ment of Rocha, 22 km SE Lascano: 1 female and 2 males, AMNH-106193; 1 female and 4 nymphs, AMNH-206195; 8 females and 5 males, AMNH-206196 (American Museum of Natural History). As with the related species, *scapteromydis* Ronderos, *fonsecai* is not known to occur in Venezuela and is included for comparative purposes.

#### DIAGNOSIS

Separable from all known South American species of *Hoplopleura* by having the apical setae of paratergal plates II-III thickened, the single apical seta of plate III, and 1 of the 2 setae on II with an apical hook (Fig. 155).

#### LENGTHS

Female, 1.4-1.55 mm; male, 1.0-1.15 mm.

#### REDESCRIPTION

**MALE** (Fig. 154): *Head* (Fig. 157). Truncate anteriorly, one anteroventral seta bent posteriad and as long as principal ventral seta. Postantennal angles rounded; principal dorsal seta stout, set at about middle of slightly convex posterolateral margin, its accessory seta thornlike; other dorsal setae thin, very small. *Thorax*. Seta medial to mesothoracic spiracle long. Sternal plate (Fig. 159, female) angled anteriorly and laterally, posterolateral margins concave, narrowing to blunt posterior apex. *Abdomen*. Lacking tergal plate or setae on segment 1; arrangement of remaining plates as usual: 1 dorsal and 2 ventral plates per typical segment, these narrow, their posteroapical rows of setae numerous; setae off plates dorsally and ventrally on segments 4-7; all setae long, thin to slightly inflated medially. Sternal plates and setae of segments 2-3 as usual in genus. Paratergal plate (Fig. 155, female) II with acute apical angles, 2 thickened apical setae, one often with apex hooked; III with both apical angles acute, bearing 1 thickened, apically hooked seta; plates IV-VI with acute apical lobes, dorsoapical lobes subdivided on IV-V; IV-VI lacking apical setae; plates VII-VIII lacking apical lobes, with usual pairs of long setae. *Aedeagus* (Fig. 160). Narrow, parameres only slightly convex laterally; pseudopenis elongate-triangular, mediolaterally serrate; apex acute.

**FEMALE** (Fig. 153): As male except for usual sexually dimorphic characters. Abdomen with 3 narrow dorsal and ventral plates and rows of long, slightly inflated setae per typical segment; setae off plates dorsally and ventrally particularly numerous on segments 5-7. Genital plate divided, with strongly reticulate pattern medially near posterior margin. Genital seta stout, medium sized, not blade-like.



**NYMPH** (Fig. 158): First and second instars represented, first instar not in condition to illustrate. Second instar with head truncate anteriorly, ventrally tuberculate; one of anteroventral setae as long as principal ventral seta, curved posteriad as in adult. Principal dorsal head seta stout, its accessory seta and other dorsal setae minute. Thoracic dorsal seta long. Anal lobe somewhat extended. One pair of subterminal abdominal setae on each side. Setation of first instar as in second; third leg not noticeably larger than second.

#### DISCUSSION

The elongate anteroventral head setae of the adult and nymph of *fonscai* suggest an exaggerated example of the condition in nymphal *scapteromydis*, as does the general configuration of the paratergal plates. The thoracic sternal plate of *fonscai* is like that found in the *quadridentata* group. The nymph is like the *alata*-related species in that the dorsal thoracic seta of the first instar is not greatly prolonged. As mentioned in the discussion of *scapteromydis*, *H. fonscai*, *H. scapteromydis*, and *H. oxymycteri* are somewhat isolated, but the morphology of the adults and known nymphs suggests a relationship to both the *quadridentata* and the *alata* groups.

#### 20. *Hoplopleura alata* Ferris

(Fig. 163-165, 175)

*Hoplopleura alata* Ferris, 1921:127, Fig. 84, 85.

*Pterophthirus alata* Ewing, 1923:147.—Werneck, 1942:317.—Hopkins, 1949:489. — Guimarães, 1950:83.—Ferris, 1951:144.

The female holotype and an unstated number of female and male paratypes were taken from the skin of *Microcavia australis* (as *Kerodon*), USNM 84175, Argentina: Patagonia, Upper Río Chico. Werneck (1942) recorded numerous examples from *M. australis* (as *Caviella*), Argentina: Provinces of Jujuy and Catamarca. I have examined a pair of paratypes from the collections of the United States National Museum. Figures of the paratergal plates (Fig. 163), thoracic sternal plate (Fig. 164), aedeagus (Fig. 165), and the sternal plate of abdominal segment 2 (Fig. 175) have been included for comparative purposes.

#### DISCUSSION

*H. alata* may serve as typical of the group of Central and South American species of *Hoplopleura* that Ewing (1923) placed in *Pterophthirus*, with *alata* as type of that genus. In

order to assess properly the affinities of the Venezuelan representative of this group, all known *alata*-group species are discussed herein. It appears that the most aberrant member of the *alata* group is the new species from Venezuela that is described in this paper, closely followed by *audax* Ferris, and then *alata*, *wernecki* (Guimarães) and *imitans* (Werneck), in descending order. The two very aberrant forms, the new species and *audax*, generally follow a northern distribution, occurring on the echimyids *Proechimys* and *Hoplomys* while *alata*, also very aberrant, and *imitans*, which is much less so, are more southern, occurring on caviids. The hosts are all hystricomorphs but belong in different superfamilies. The host and geographical distribution of *wernecki* is incompletely known, except that it is a common parasite of *Proechimys iheringi*. If *wernecki* occurs only on species of *Proechimys*, it would not extend south into areas where members of that rodent genus do not occur.

On the one hand, *fonscai* Werneck, *scapteromydis* Ronderos, and *oxymycteri* Ferris, all from cricetine rodents, appear to link *alata*-group species with the *quadridentata* group, while *wernecki* and *imitans* show characters in common with *H. disgrega* Ferris and its allies.

Unlike its closest relatives, *audax* and the new species, *alata* has the dorsal head setation like that of typical species of *Hoplopleura*, and the seta medial to the mesothoracic spiracle is long, not short. All the abdominal plates are well developed in both sexes of *alata*, and sword-shaped or inflated setae are present both dorsally and ventrally. The female has 3 sternal plates and rows of setae on each of the typical abdominal segments (15 in all, anterior to the genital plate, which is divided into 2 plates).

#### 21. *Hoplopleura audax* Ferris

(Fig. 161, 162, 166, 170, 173, 181, 183, 186-188)

*Hoplopleura audax* Ferris, 1921:125, Fig. 82, 83.

*Pterophthirus audax* Ewing, 1923:148.—Ferris, 1923:281.—Werneck, 1942:317. — Hopkins, 1949:493.—Ferris, 1951:144, 147.

The female holotype and male allotype were taken from a museum skin of *Proechimys semispinosus calidior*, USNM 113273, North Ecuador: San Javier. A female paratype was taken from the skin of a *Tylomys mirae* (as *Nelomys mincae*) USNM 113303, collected from the same locality. Werneck (1942) recorded "numerous examples" ex *Proechimys guyannensis oris* (as

*P. oris*), Brazil: State of Pará, Abaté, and Hopkins (1949) included records of two collections from skins of *Proechimys semispinosus calidior* (as *P. cayennensis calidior*). The specimens from *Proechimys* species may be representatives of the new species described in this paper.

Two species are present in the type series of *Hoplopleura audax* Ferris. The female holotype, from "*Proechimys semispinosus*" (Fig. 82 and 83a of Ferris, 1921), and the female para-

type from *Tylomys mirae* are conspecific. The male allotype (Fig. 82 and 83b of Ferris, 1921) is a specimen of a new species described in this paper. Hopkins (1949), in speaking of a doubtful record of the biting louse *Gyropus setifer* from *Proechimys semispinosus* (USNM skin 113273—the type host of *audax* Ferris), said that *Hoplopleura gymmurus* was taken from the same locality and suggested that contamination may have taken place. Probably contamination

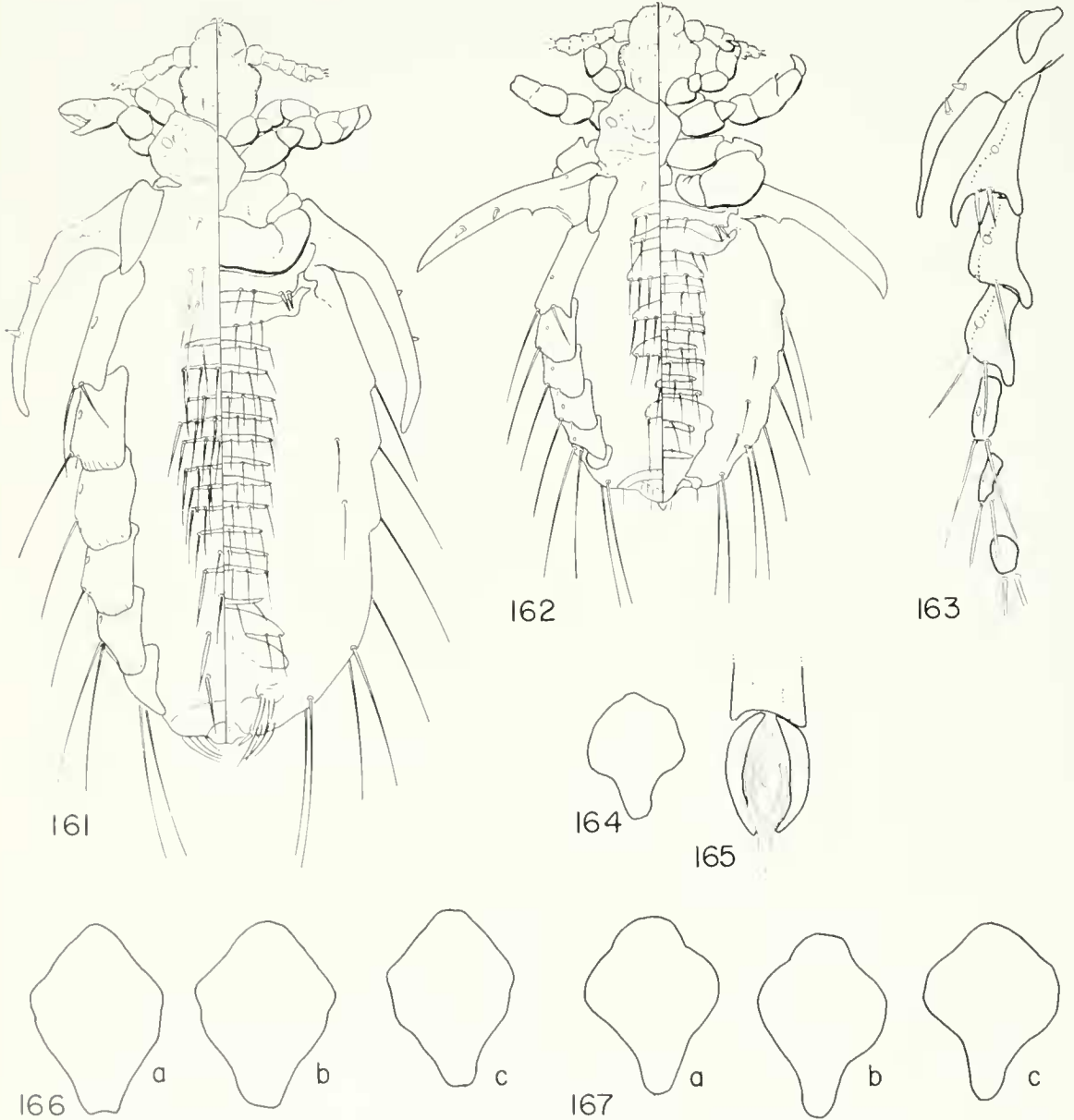


Fig. 161-167. *Hoplopleura alata* group. 161, *H. audax* Ferris, female, Panama, ex *Hoplopleura gymmurus*, 4038; 162 same, male, 163, *H. alata* Ferris, paratergal plates, female paratype; 164, same, thoracic sternal plate; 165, same aedeagus; 166, *H. audax*, thoracic sternal plate (a, holotype; b, female paratype, Ecuador, ex *Tylomys mirae*, c, female, Panama ex *H. gymmurus*, 1038), 167, *H. splendida*, new species, thoracic sternal plate (a, female holotype; b, male paratype, Ecuador, ex *Proechimys semispinosus*, USNM-113273 [allotype of *H. audax* Ferris]; c, female, Brazil, ex *P. guyanensis*, RO-8571).

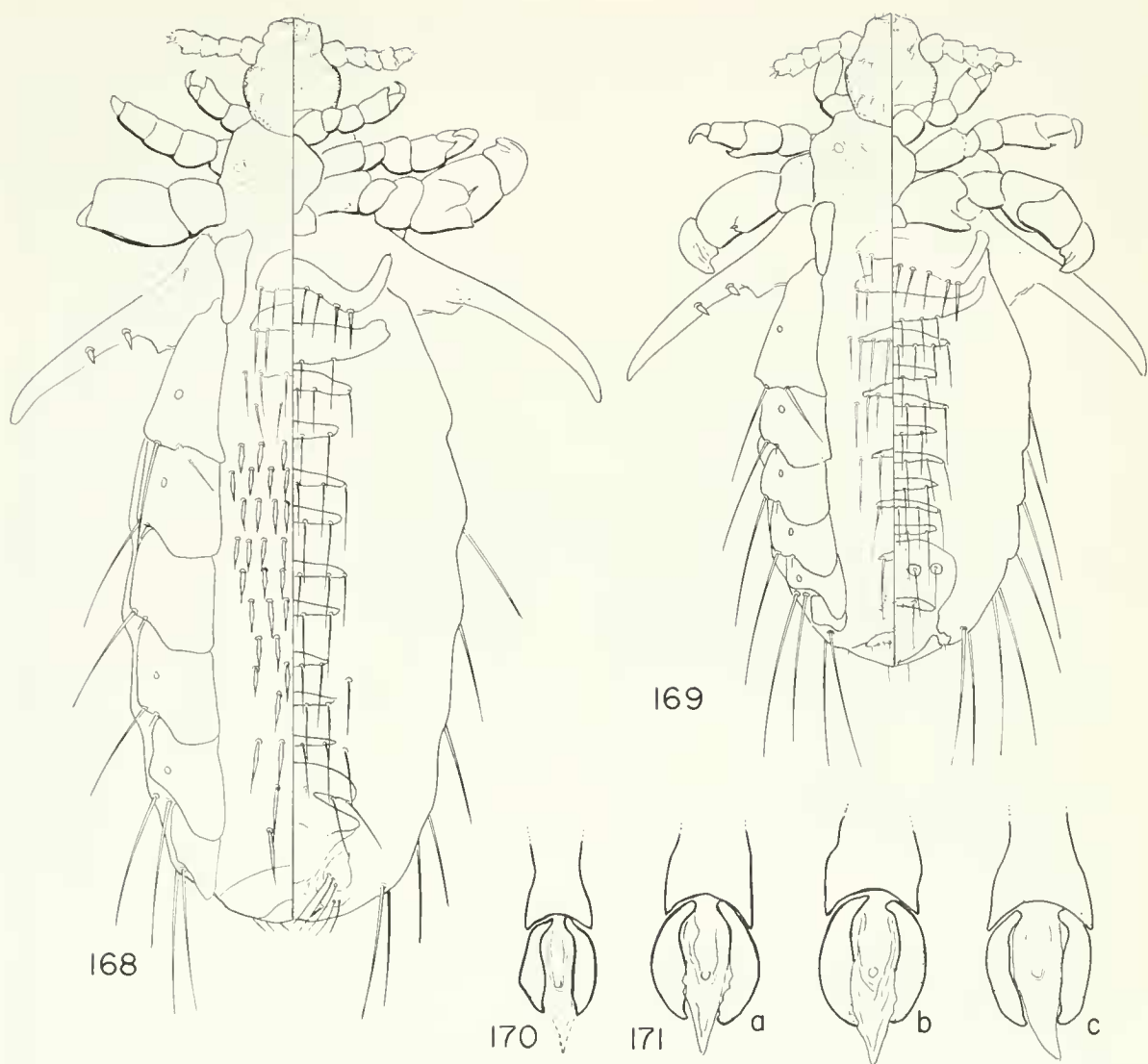


Fig. 168-171. *Hoplopleura alata* group. 168. *H. splendida*, new species, holotype; 169, aedeagus; 170, *H. audax* Ferris, Panama, ex *Hoplopleura gymnurus*, 4038; 171, *H. splendida*, aedeagus (a, allotype; b, Brazil, ex *Proechimys guyannensis*, RO-8571; c, paratype, Ecuador, ex *Proechimys semispinosus*, USNM-113273 [allotype of *H. audax* Ferris]).

also occurred with the holotype of *H. audax*, which may have been from *Hoplopleura gymnurus*, not *Proechimys semispinosus*. Whether the record of *audax* from *Tylomys mirae* is valid remains to be seen.

From the collections of the U.S. National Museum, I have examined 3 females and 1 male of true *audax* ex *Hoplopleura gymnurus*, Panama: Cerro Azul, 29-I-58, R. M. Altman collector, no. 4038; and a female as above but Agnadulce, 9-IX-57, no. 4086. I have also seen the female holotype and the paratype ex *Tylomys mirae*.

#### DIAGNOSIS

Separable from all described species of *Hoplopleura* except *alata* Ferris in having para-

tergal plate II greatly prolonged apically and bearing 2 thornlike setae medially. Distinguished from *alata* by having the apical lobes of paratergal plates III-VI squared or truncate, not acute or missing (compare Fig. 163 and 187), and in having a short, not a long, seta medial to the mesothoracic spiracle.

#### LENGTHS

Female holotype, 1.2 mm; paratype, 1.3 mm; Panama specimens, females, 1.25 mm; male, 0.9 mm.

#### REDESCRIPTION

FEMALE (Fig. 161): *Head* (Fig. 181, 183, 186). Preantennal area with strong dorsal sclerotization; postantennal angles evident, postero-

lateral head margins somewhat indented below these angles, giving slightly bulbous appearance. Principal dorsal seta longer than other dorsal setae. *Thorax*. Sternal plate (Fig. 166) large, squared posteroapically, bluntly angled anteriorly; posterolateral margins not concave. Seta medial to mesothoracic spiracle small. *Abdomen*. Each typical segment of abdomen with

usual 3 dorsal rows of setae, and with 3 ventral rows on typical segments; anterior to coalesced genital plate the total is 14 rows. All abdominal setae thin, long; tergal rows of segments 3-5 accompanied by narrow but defined plates; all sternal rows with plates; sternal plate of segment 2 with 2 close-set thornlike setae laterally on each side (Fig. 173). First sternal

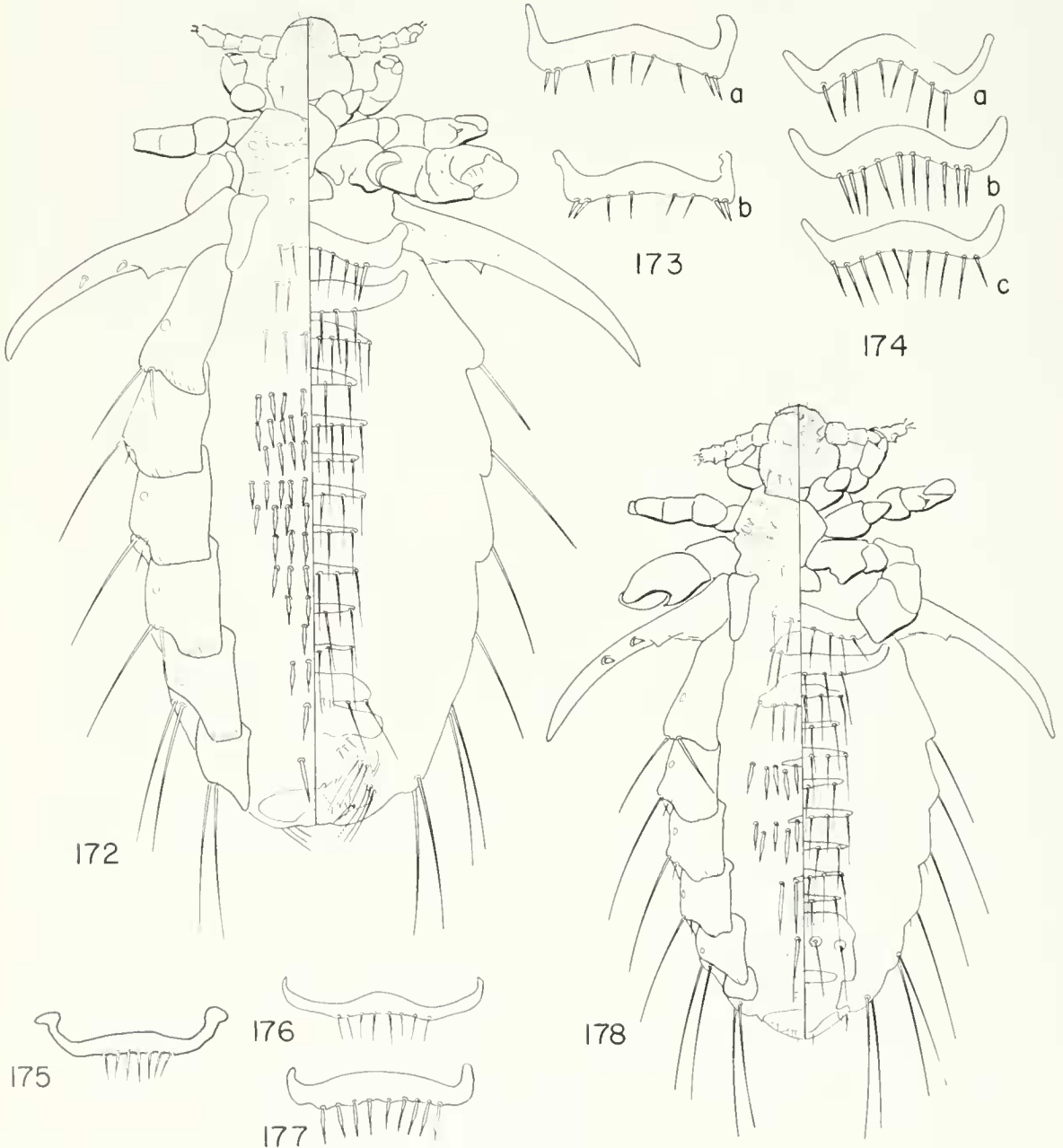


Fig. 172-178. *Hoplopleura alata* group. 172, *H. splendida*, new species, female, Brazil, ex *Proechimys guyanensis*, RO-8571. Sternal plate of second abdominal segment: 173, *H. audax* Ferris (a, holotype; b, female, Panama, ex *Hoplomys gymmurus*, 4038). 174, *H. splendida* (a and b, female, Venezuela, ex *P. guyanensis*; c, male paratype, Ecuador, ex *Proechimys semispinosus*, USNM-113273 (allotype of *audax* Ferris); 175, *H. alata* Ferris, female paratype; 176, *H. wernecki* (Guimarães), female paratype; 177, *H. imitans* (Werneck), male, Uruguay, ex *Cavia* species, AMNH-260409, 178, *H. splendida*, male, Brazil, ex *P. guyanensis*, RO-8571.



plate of segment 3 lacking modified setae but laterally approaching corresponding paratergal plates. Ventrally with 2 or more setae laterally, far removed from sternal plates. Paratergal plates (Fig. 187, 188) with plate II prolonged dorsoapically into winglike process bearing 2 short, thornlike setae mediodorsally; plates III-VIII entirely on dorsum, all lacking ventral apical lobe; III with acute dorsoapical lobe and 2 long apical setae; IV-VI with short squared dorsoapical lobe and 1 long and 1 short to minute apical setae; plates VII-VIII with usual pair of long setae and rounded-acute dorsoapical lobe. Genital plate entire. Genital seta short, stout.

**MALE** (Fig. 162): As female except for usual sexually dimorphic characters. *Abdomen*. Typical segments with 1 tergal, 2 sternal plates each; these well developed on segments 2-5 dorsally, but obsolescent on 6-7. Ventral plates normal, all present. Tergal setae thin, none short or sword like; sternal setae also thin. Setae present ventrolaterally, distant from plates. Paratergal plates (Fig. 188) as in female, except plate VIII lacks an apical lobe. *Aedeagus* (Fig. 170). With parameres slightly angulate laterally, not strongly convex; pseudopenis in specimen drawn turned back upon itself, probably as shown by dotted lines.

22. *Hoplopleura splendida*, new species<sup>o</sup>  
(Fig. 167-169, 171, 172, 174, 178-180, 182,  
185, 189-191)

*Hoplopleura audax* Ferris, 1921:125, Fig. 82 (male), 83b (partim, male only). — ?Wernneck, 1942:317. — ?Hopkins, 1949:493 (probably the records from *Proechimys guyannensis* (as *P. cayennensis*), records from other species of *Proechimys*).

**TYPE DATA:** Female holotype, male allotype, 49 female and 27 male paratypes, ex *Proechimys guyannensis* (SVP 12599), Venezuela: Bolivar, 146 km S, 7 km E Ciudad Bolivar, 306 m elev., 5-IV-67, Peterson team collectors. Other paratypes, all from *P. guyannensis* and *P. semispinosus*, number 155 females and 77 males in 57 collections from various localities in the states of Bolivar, Trujillo, Yaracuy, T. F. Amazonas, Falcon, Carabobo, Apure, Barinas, and Zulia. Also included in the series of paratypes is the allotype (male) of *audax* Ferris, from a skin of *Proechimys semispinosus*, USNM-113273, North Ecuador: San Javier. There were 35 nymphs of various stages associated with

the Venezuelan adults listed above.

Also Examined: 68 females, 28 males, and 14 nymphs in 37 collections from *Proechimys* species, various Venezuelan localities; and other specimens (all from USNM) as follows: 2 females ex *P. guyannensis*, Bolivia: A. de Guarayos, Beni, 8-VI-64, P. Hershkovitz, collector, 5774; 1 female and 1 male ex *Proechimys guyannensis trinitatis*, Trinidad: Cumaca, 21-VI-51, T. H. G. Aitken collector, TRVL-147; 1 male as above but 3-VII-54, TRVL-239; 3 females and 1 male from rat (probably *Proechimys*) as above but 19-VII-54, TRVL-206; 3 females from a skin of *Proechimys semispinosus calidior*, USNM-113275, Ecuador: San Javier (from the same group of skins that yielded the type series of *audax* Ferris).

With certain reservations, discussed later, I also place with *H. splendida*, new species, a series of 15 females and 5 males taken in three collections ex *Proechimys guyannensis*, Brazil: Amapá Territory, Serra do Navio, RO-8571 and RO-8656; and Pará, Belém, Utinga Forest, RO-8576, T. H. G. Aitken collector, Rockefeller Foundation.

#### DIAGNOSIS

Close to *audax* Ferris. Both sexes separable from *audax* by lacking paired, short, thornlike apical setae on the second abdominal sternal plate (Fig. 174), and with the postantennal head margins smoothly convex, not at all bulbous anteriorly (Fig. 182, 184, 185). Further separable in the female by lacking abdominal tergal plates below segment 3 and by having the tergal rows below segment 3 composed of short, sword-shaped setae (Fig. 168, 172) and in having 2, not 3, rows of sternal setae per typical abdominal segment, i.e., with 11 (sometimes 10) rows of sternal setae anterior to the coalesced genital plates. The male differs from *audax* by having the aedeagus larger and with the parameres smoothly convex.

#### LENGTHS

Female holotype, 1.5 mm; male allotype, 1.1 mm; female paratypes (extended), 1.3-1.55 mm; male paratypes, 0.95-1.15 mm.

#### DESCRIPTION

**FEMALE** (Fig. 168): *Head* (Fig. 185, male). Shape somewhat dependent on amount of flattening during mounting, preantennal area and its dorsal sclerotization somewhat flattened, this sclerotization narrower medially; lateral postantennal margins evenly convex; principal dorsal seta slightly larger than other dorsal setae.

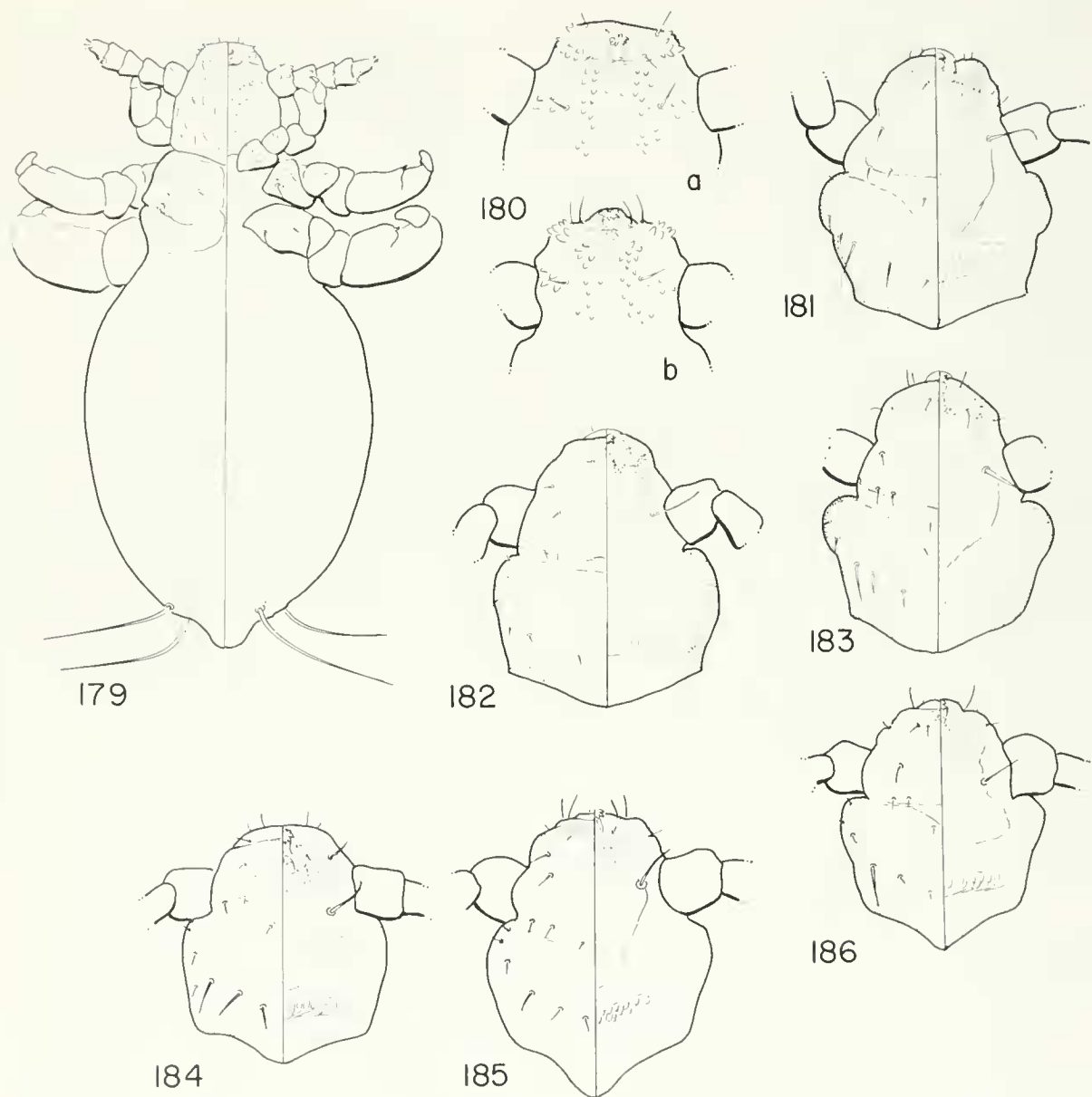


Fig. 179-186. *Hoplopleura alata* group. 179, *H. splendida*, new species, nymph, third instar, Falcon, ex *Proechimys semispinosus* (SVP 24145); 180, same, anterior of head, ventral view (a, as figure 179, b, Falcon, ex *Proechimys semispinosus* [SVP 24029]). Head: 181, *H. audax* Ferris, holotype; 182, *H. splendida*, male paratype, Ecuador, ex *Proechimys semispinosus*, USNM-113273 (allotype of *H. audax* Ferris); 183, *H. audax*, female paratype, Ecuador, ex *Tylomys mirae*; 184, *H. splendida*, male, Brazil, ex *P. guyanensis*, RO-8571; 185, same, allotype; 186, *H. audax*, female, Panama, ex *Hoplomys gymnurus*, 4038.

**Thorax.** Sternal plate (Fig. 167) rounded and bulbous anteriorly, posterolateral margins slightly concave, posterior apex rounded to rounded-truncate; seta medial to mesothoracic spiracle short. **Abdomen.** Typical segments with only 2 sternal rows of setae and 2 sternal plates each; apical setae of these rows long, thin. Ventrally, 2 or more setae off plates but not far removed laterally; sternal plate of segment 2 and first plate of segment 3 extended to approximate

corresponding paratergal plates; both plates lacking modified setae, though on plate of segment 2 the most lateral 2 setae on either side may be somewhat larger than others. Dorsum lacking plates on segments 4-8; typical segments with 3 tergal rows of setae, these setae sword shaped. Paratergal plates (Fig. 191) with plate II having the dorsoapical lobe greatly elongate and bearing 2 thornlike setae dorsomedially; plates III-VIII lacking ventroapical lobes, placed

entirely on dorsal surface; plate III with narrowly rounded dorsoapical lobe and 2 long apical setae; plates IV-VI with truncate dorsoapical lobe, also 1 very long and 1 small to minute apical setae; plates VII-VIII with usual pair of long apical setae with dorsoapical lobe narrowly rounded, especially that of VIII. Genital plate coalesced medially, genital seta short and stout.

**MALE** (Fig. 169): Head and thorax as in female. *Abdomen*. Arrangement of tergal and sternal plates and accompanying setae as usual: 2 plates and rows of setae ventrally on typical segments and 1 plate and row of setae dorsally on each segment; the dorsal plates becoming obsolescent posteriorly. All abdominal setae long, thin. Paratergal plates (Fig. 189) as female except plate VIII lacks an apical lobe. *Aedeagus* (Fig. 171a). Parameres convex, strongly sclerotized, especially apically; pseudopenis slightly serrate, broad medially, tapering to acute apex.

**NYMPH** (Fig. 179): In all stages the head is similarly shaped and the abdomen bears 2 pairs of long subterminal setae. As with most nymphs of *Hoplopleura*, third tibiotarsus of third instar much larger than second tibiotarsus. In second instar this difference less marked; in first instar these tibiotarsi equal in size. Unlike many *Hoplopleura*, dorsal thoracic seta not prolonged in first instar. Head shape depends upon amount of flattening during mounting (Fig. 180). Head ventrally with many small tubercles, those of medial portion rounded apically and very small. Dorsal head setae strong, principal dorsal seta only somewhat longer than others. Coxae rugose to tuberculate. Thoracic dorsal setae small to minute. Abdomen leathery, slightly scaly; anal lobe not extended.

#### DISCUSSION

The series from Brazilian *Proechimys guyannensis* differs sufficiently to merit illustration and comment. The head (Fig. 184) is slightly broader than in Venezuelan specimens and the lateral postantennal head margins are more nearly parallel, though slight flattening during mounting of the Venezuelan material may be responsible for the difference. Male aedeagi (Fig. 171a, b) are similar, and length of the various dorsal head setae varies in both populations. Paratergal plates are similar, but the Brazilian specimens have the shorter of the apical setae on plates IV-VI usually longer than in the Venezuelan series. The thoracic sternal plate is usually broader, the anterior apex less bulbous, and the posterior apex narrower than in the Venezuelan specimens (Fig. 167c). Fe-

males of both populations have similar abdominal setation (Fig. 168, 172) but males differ. Brazilian males have the tergal setae on segments 4-6 sword shaped, while in the Venezuelan series these setae are always thin and long (Fig. 169, 178).

The Brazilian form may represent variation that is geographical, but not necessarily hostal, or its members may constitute a new species. The specimens from *Proechimys guyannensis trinitatis*, Trinidad, are like the Venezuelan series except that the lateral setae on the sternal plate of the second abdominal segment are definitely larger than the others, and they occur more distally than in the Venezuelan and Brazilian forms, being reminiscent of the configuration found in *audax*. The 2 females from Bolivian *P. guyannensis* are like the Venezuelan series. *H. audax*, *H. splendida*, new species, and the Brazilian population could represent a former cline that, through prolonged geographical (and hostal?) isolation, developed into 2 or possibly 3 species. Now *audax* and *splendida* from Venezuela occur sympatrically in some areas and possibly on the same species of host, though this seems unlikely. The Venezuelan and Brazilian populations, on the other hand, may be allopatric. Of particular interest is the difference in number of abdominal sternal plates in females of *audax* and *splendida*. In both sexes, the number of abdominal plates has been considered an important character in *Hoplopleura*. However, a similar difference occurs in another pair of very closely related species of *Hoplopleura*—*hirsuta* Ferris and *arizonensis* Stojanovich and Pratt—from *Sigmodon hispidus*. Thus, perhaps this character is not as indicative of broad separation of species as formerly thought.

#### 23. *Hoplopleura wernecki* (Guimarães) (Fig. 176, 200, 204, 205)

*Pterophthirus wernecki* Guimarães, 1950:83, Figs. 1-10.—Ferris 1951:144, 147.

The male holotype (no. 46.016) and female allotype (no. 46.017), 461 females and 138 males, and numerous nymphs constituted the type series. They were collected from *Proechimys i. iheringi*, Brazil: State of São Paulo. Boracéia. *H. wernecki* was not represented in the Venezuelan collections. I have examined a pair of paratypes from the collections of the U.S. National Museum.

#### DISCUSSION

As with *alata* Ferris, *audax* Ferris, and *splendida*, new species, *wernecki* has the dorsoapical

lobe of paratergal plate II extended into a long process, but rather than bearing 2 short, thorn-like setae medially on the process, there is 1 long seta in the usual position at the base of the extended lobe (Fig. 200). The female, like *imitans* (Werneck) and *alata*, has 15 sternal rows of setae and plates anterior to the 2 genital plates (in all these species, the genital plate remains in two parts, not coalesced as in *audax* and *splendida*, new species). That is, there are 3 ventral rows of setae on each of the typical

abdominal segments. Like typical *Hoplopleura*, the principal dorsal head seta is much longer than the other dorsal setae, and the paratergal plates wrap around the lateral margins of the abdomen instead of occurring only dorsally (Fig. 200, 204). As in *audax* and *splendida*, new species, the female has 1 apical lobe on paratergal plate VII, while this lobe is missing in the male. The aedeagus is similar to those of *alata*, *splendida*, new species, *audax*, and *imitans*. The pseudopenis is not so narrowed api-

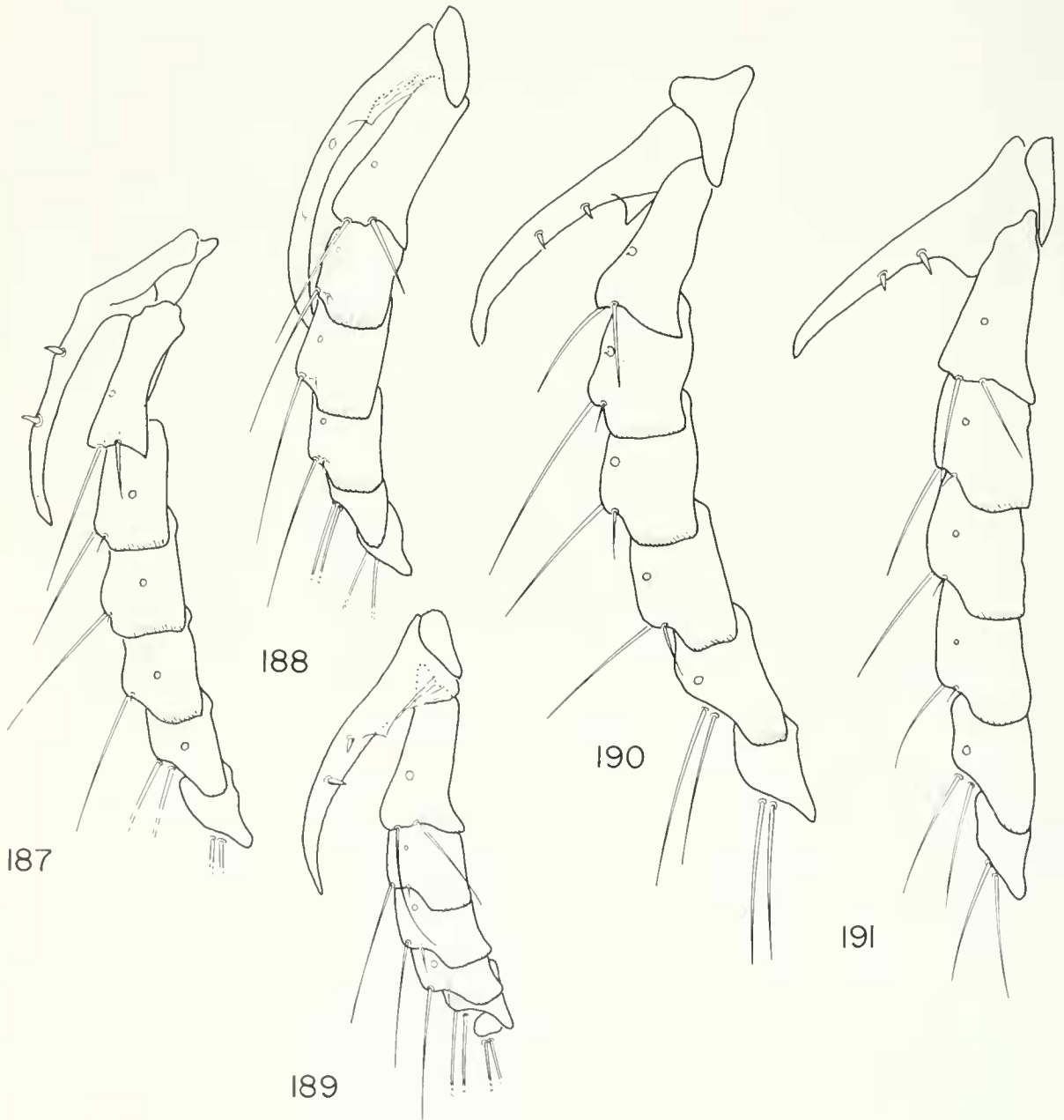


Fig. 187-191. *Hoplopleura alata* group, paratergal plates. 187, *H. audax* Ferris, female, Panama, ex *Hoplomys gymnurus*, 4038. 188, *H. audax*, holotype; 189 *H. splendida*, new species, allotype; 190, same, female, Brazil, ex *Proechimys guyanensis*, RO-8571; 191, same, holotype.



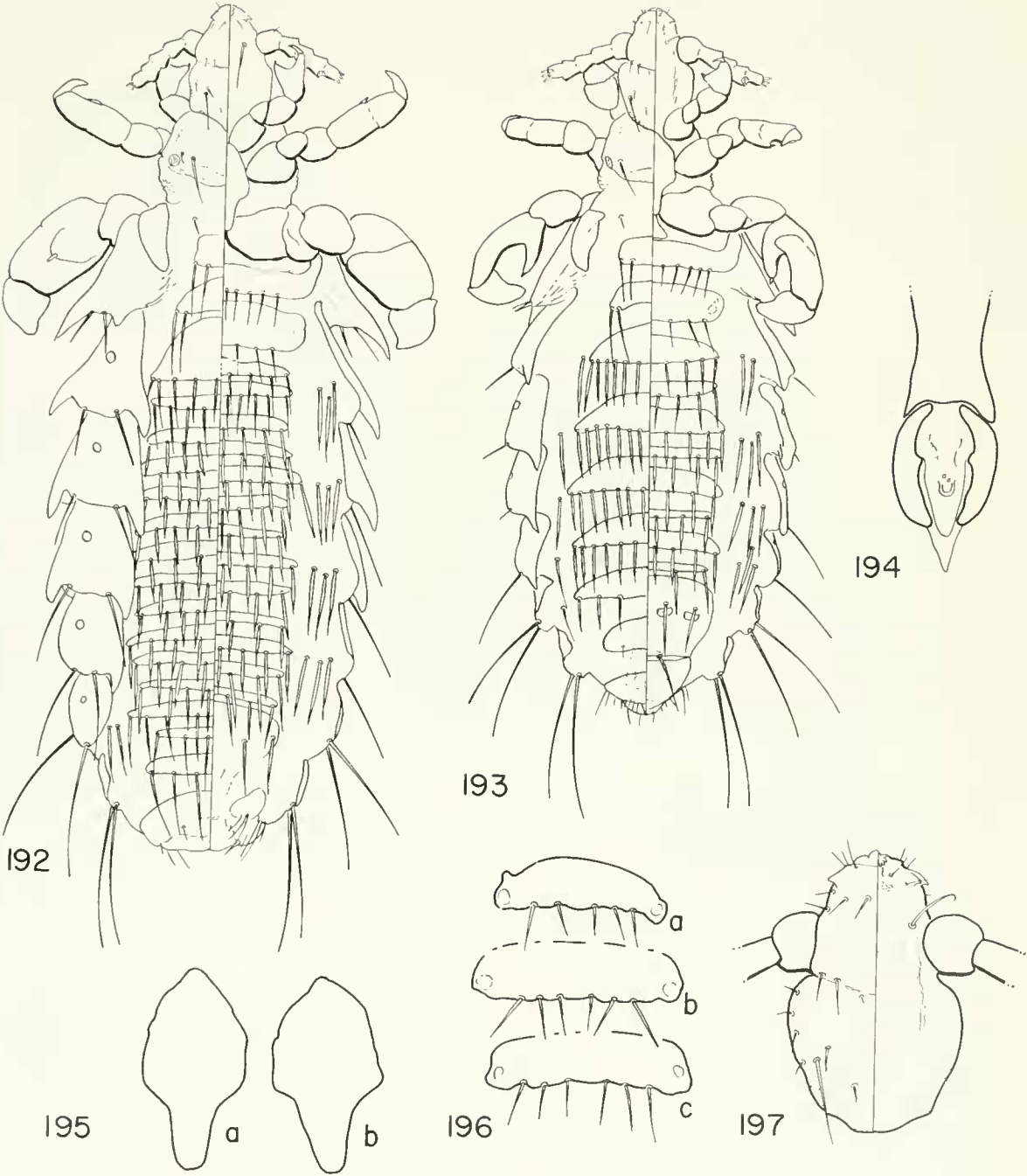


Fig. 192-197. *Hoplopleura imitans* (Werneck). 192, female, South America, ex *Cavia pamparum* (British Museum); 193, male, Uruguay, ex *Cavia* species; 194, aedeagus, same; 195, thoracic sternal plate (a, female, South America, ex *C. pamparum*; b, male, Uruguay, ex *Cavia* species); 196, first sternal plate of third abdominal segment (a, male, Uruguay; b and c, female, South America); 197, head, male, Uruguay.

cally as in *alata*, but narrower than that of the other species, and the parameres are less convex laterally than in any of the other species.

The second nymph of *wernecki* (figured by Guimarães) is very like that of *splendida*, new species.

24. *Hoplopleura imitans* (Werneck)

(Fig. 177, 192-197, 201-203)

*Pterophthirus imitans* Werneck, 1942:318, Fig. 1-5.—Guimarães, 1950:83.—Ferris, 1951:144, 147.

The male holotype, female allotype, and 2 female paratypes were collected from *Cavia aperea*, Brazil: State of São Paulo, Santo Amaro. *H. imitans* was not represented in the Venezuelan collections. I have seen specimens agreeing with the original description as follows: 6 females ex *Cavia pamparum*, South America (in the Zoological Society of London Gardens), 20-III-69, British Museum (Natural History); a single male from *Cavia* sp., Uruguay: Department of Lavalleja, 25-IV-63, S. Anderson collector, AMNH 206409, American Museum of Natural History; and from U.S. National Museum, 1 female (lacking the head), from the skin of *Cavia pamparum*, USNM 236344, Argentina: Chaco, Las Palmas, 1-VII-20, A. Wetmore collector.

DISCUSSION

The geographical range of *imitans* is apparently broad, and the host range is unknown, though probably only species of *Cavia* are concerned. In some ways, *H. imitans* more nearly approaches typical species of *Hoplopleura* than other *alata*-group species. The paratergal plates (Fig. 201-203) are quite typical, except that the dorsoapical lobe of II is somewhat prolonged, its appearance apparently somewhat dependent on position. The female (Fig. 192) has 3 rows of sternal setae and 3 sternal plates on each typical abdominal segment (15 in all, anterior to the divided genital plate), and the dorsal setation of the head is also typical. The first sternal plate of abdominal segment 3 does not extend to the corresponding paratergal plate (Fig. 192, 193), and its setation is somewhat variable, with the lateral setae sometimes slightly enlarged and set at an angle, more or less as in typical species of *Hoplopleura* (Fig. 196, a-c). The aedeagus (Fig. 194) is similar to that of *audax* Ferris and *splendida*, new species, and, like these species, the length of the paratergal setae is quite variable (Fig. 201, 203). The preantennal area of the head approaches

certain species now placed in *Eulinognathus* and a new *disgrega*-related species described here, by having 2 lateral toothlike projections (Fig. 197).

25. *Hoplopleura inusitata*, new species<sup>o</sup>

(Fig. 198, 199, 206-209, 213, 216)

TYPE DATA: Male holotype, female allotype, 3 female and 1 male paratypes, and 4 nymphs, ex *Echimyus semivillosus* (SVP 35380), Venezuela: Lara, 10 km N El Tocono, 518 m elev., 22-VII-68, Tuttle team collectors; 1 male paratype (SVP 35375), as above; 1 female paratype and 1 nymph (SVP 44928), as above but 18-VII-68; 1 male paratype (SVP 35370), as above but 22-VII-68; 4 female and 1 male paratypes and 1 nymph (SVP 44717, 44822), as above but 17-VII-68.

DIAGNOSIS

Related to *disgrega* Ferris and *chilensis* Werneck. Like those species, the first sternal plate of the third abdominal segment does not bear modified setae and is not extended laterally to articulate with or approximate the corresponding paratergal plate. Both sexes of *inusitata* differ by having the thoracic sternal plate incomplete and poorly sclerotized (Fig. 216). Further separable in the female from both *disgrega* and *chilensis* by having 3 sternal plates on each of the typical abdominal segments.

LENGTHS

Male holotype, 1.25 mm; female allotype, 1.7 mm; female paratypes, 1.5-1.9 mm; male paratypes, 1.1-1.25 mm.

DESCRIPTION

MALE (Fig. 207): *Head* (Fig. 208). Longer than broad, preantennal area prominent, squared, bearing thornlike tubercles laterally at apex. Plate on venter of head large, covering entire surface except edges. One laterodorsal head seta almost as long as principal dorsal seta, other dorsal setae also well developed. Postantennal angles present, rounded, posterolateral margins slightly convergent posteriorly. Sensoria of antennal segments 4-5 very large; 2 short, stout setae dorsally on antennal segment 3 and 1 such seta on segment 4. *Legs*. Coxae well separated, third coxa of regular shape, lacking posterior processes, remainder of third leg not compressed. *Thorax*. Sternal plate (Fig. 216, female) free only at anterior and posterior apices; with medial elongate, irregularly sclerotized area. Seta medial to mesothoracic

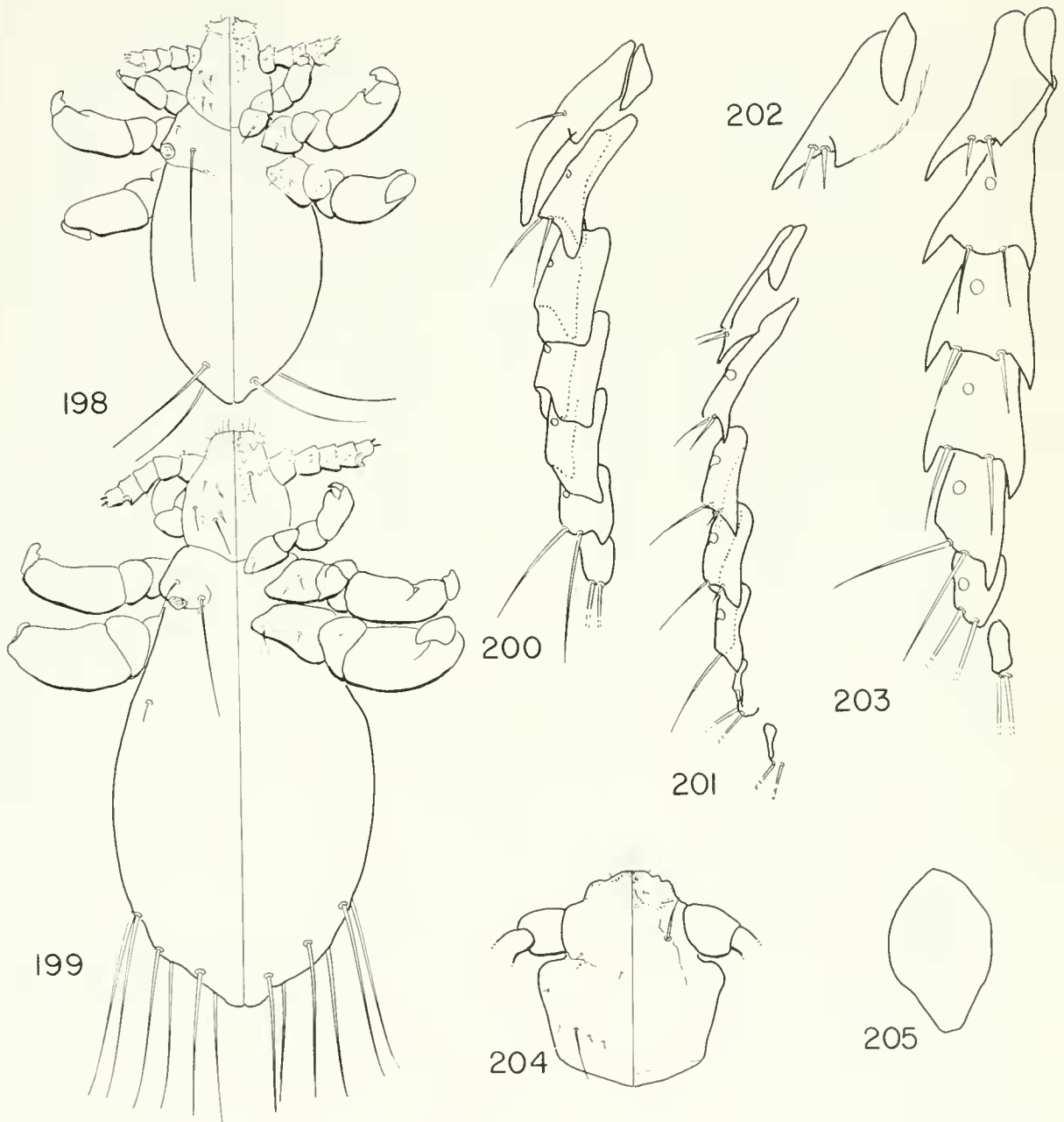


Fig. 198-205. *Hoplopleura* species. 198, *H. inusitata*, new species, nymph, first instar ex *Echimyus semivillosus* (SVP 44717); 199 same, third instar, ex (SVP 44822). Paratergal plates: 200, *H. wernecki* (Guimarães), female paratype; 201, *H. imitans* (Werneck), male, Uruguay, ex *Cavia* species; 202, same, plate H, female, South America ex *Cavia pamparum*; 203, same, female, South America; 204, *H. wernecki*, head, male paratypes; 205, same, thoracic sternal plate, female paratype.

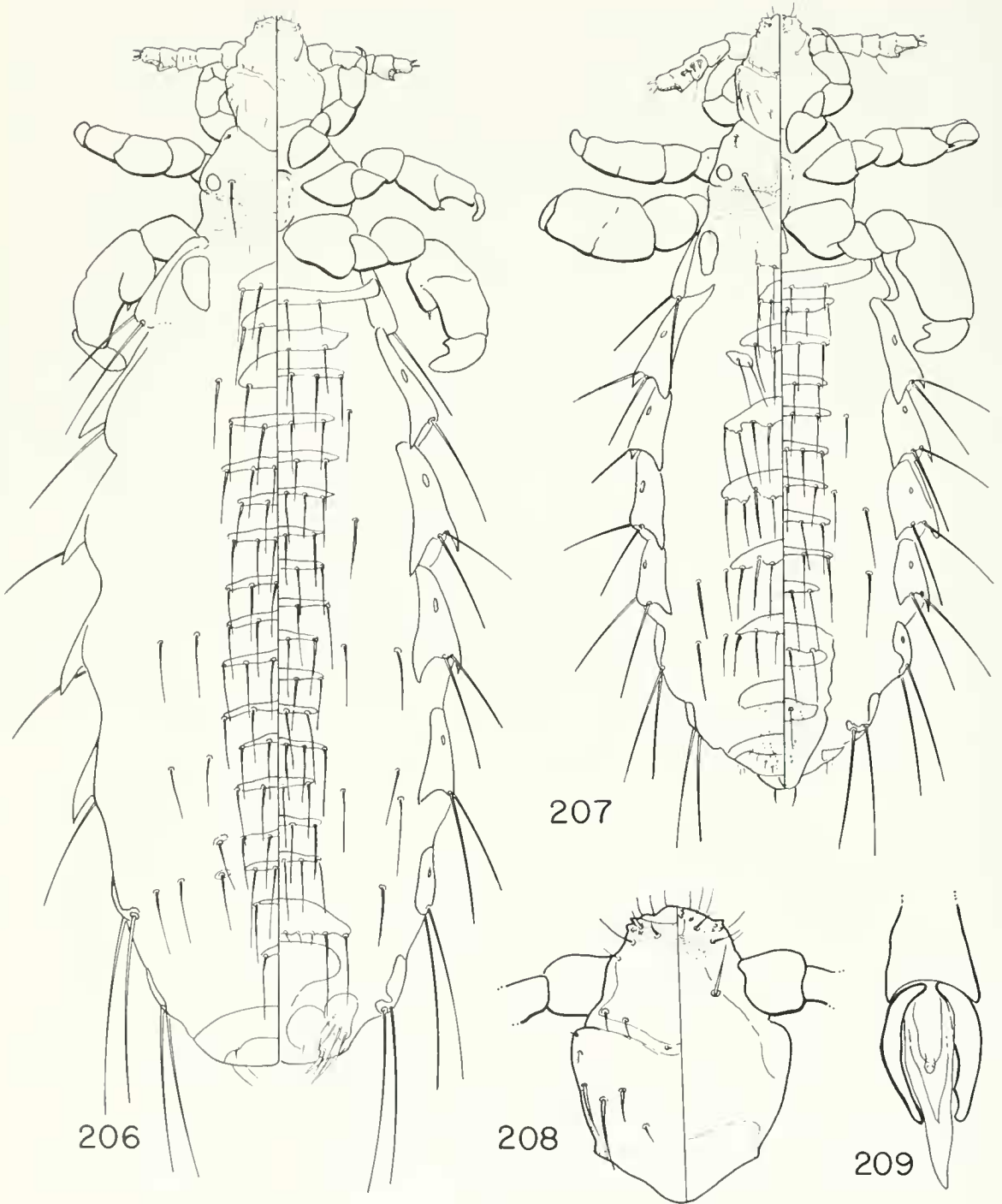


Fig. 206-209. *Hoplopleura inusitata*, new species. 206, allotype; 207, holotype; 208, head, male paratype (SVP 35380); 209, aedeagus, holotype.



spiracle long. *Abdomen*. Leathery and scaly, plates reduced, variously developed. Sternal plate of segment 2 extended laterally to approach corresponding paratergal plates, but first sternal plate of segment 3 not so extended, lacking enlarged setae. Remainder of abdominal plates as usual in genus, with 1 tergal and 2 sternal plates on each of typical segments, their apical setae long, thin; those of tergal plates appearing as two coalesced rows; posterior margin of plate bearing them scalloped. Several setae laterally off plates both dorsally and ventrally. Paratergal plates II-VIII (Fig. 213, female) each bearing 2 long apical setae; plates III-VI with both apical angles produced into narrow pointed lobes; plates VII-VIII lacking apical angles. *Aedeagus* (Fig. 209). With pseudopenis elongate, triangular, flexible, blade-like; extending almost half its length beyond apices of parameres.

**FEMALE** (Fig. 206): Head, thorax, and legs as in male except dorsal setae of antennal segments 3-4 not as enlarged. *Abdomen*. As in male except for usual sexual dimorphism; 3 sternal and 3 tergal plates and rows of setae per segment, plates narrow and variously developed. Genital plate divided; genital seta short, stout.

**NYMPH** (Fig. 198, 199): Typical of *Hoplopleura*. In all instars, head with ventral tubercles and preantennal corona of thornlike tubercles; antennae also tuberculate ventrally. Dorsal head setae well developed, 1 lateral seta almost as large as principal dorsal seta. *Third instar* (Fig. 199). With seta anterior to spiracle of mesothorax very well developed. *Abdomen* scaly, lacking plates or spiracles; with 1 small seta each side anterodorsally and 3 pairs of subterminal setae on each side; anal segment not elongate. *Second instar*. Similar to third but with anterodorsal thoracic seta short; lacking anterodorsal setae of abdomen; and with only 2 pairs of long subterminal setae on abdomen, each side. *First instar* (Fig. 198). Thorax and abdomen as in second instar except seta mesad to mesothoracic spiracle very long, and with only 1 pair of subterminal abdominal setae.

## 26. *Hoplopleura orinocoi*, new species<sup>o</sup>

(Fig. 210-212, 214, 215)

**TYPE DATA:** Male holotype, 2 male paratypes ex *Mesomys hispidus* (SVP 16830), Venezuela; T. F. Amazonas, about 84 km SSE Esmeralda, 138 m elev., 16-III-67, Tuttle

team collectors; 1 male paratype (SVP 17316), as above but 20-III-67. Female unknown.

## DIAGNOSIS

Close to *H. inusitata*, new species, *H. disgrega* Ferris, and *H. chilensis* Werneck. Like the latter 2 species, with the anteroventral head plate divided into 2 elongate posteriorly divergent sclerotizations. Separable from *disgrega* by having the apical paratergal setae thin, pointed, and longer than the plates bearing them. Distinct from *chilensis* by having the apical setae of paratergal plates III-VI all longer than the plate bearing them. Distinct from *inusitata*, new species, by having the head almost as broad as long (Fig. 211), with large, rounded postantennal angles and convex lateral postantennal margins; by having the anteroventral head plate divided; and by lacking tubercles on the preantennal head region. Further separable from *inusitata* in having the abdominal plates well developed and with many apical setae.

## LENGTHS

Holotype, 1.3 mm; paratypes, 1.3-1.45 mm.

## DESCRIPTION

**MALE** (Fig. 210): *Head* (Fig. 211). Almost as broad as long; preantennal area not prolonged, anteriorly rounded; postantennal angles extended laterally, rounded; posterolateral margins convex, convergent posteriorly. Principal dorsal seta and accessory seta long, about same size; one of laterodorsal seta of similar size. *Legs*. Coxae well separated, third coxa of regular shape, lacking posterior projections, remainder of leg not compressed or otherwise modified. *Thorax*. With sternal plate (Fig. 215) separate only at anterior and posterior apices; oval and heavily sclerotized medially. Seta medial to mesothoracic spiracle long; also with well-developed seta directly anterior to spiracle. *Abdomen*. Sternal plate of segment 2 extended laterally to approach corresponding paratergal plates. First sternal plate of segment 3 not so extended, lacking enlarged setae. Tergal plates, and sternal plates below segment 3 arranged as usual; 1 large tergal plate and 2 narrower sternal plates per typical segment. Apical setae of these plates numerous, long, thin, although dorsal ones somewhat inflated. Several setae off plates both dorsally and ventrally. Paratergal plates (Fig. 214) each with pair of long apical setae; plates III-VI with both apical angles extended into acute lobes; plates VII-VIII lacking lobes. *Aedeagus* (Fig. 212). With flexible bladelike pseudopenis extending well beyond apices of parameres.

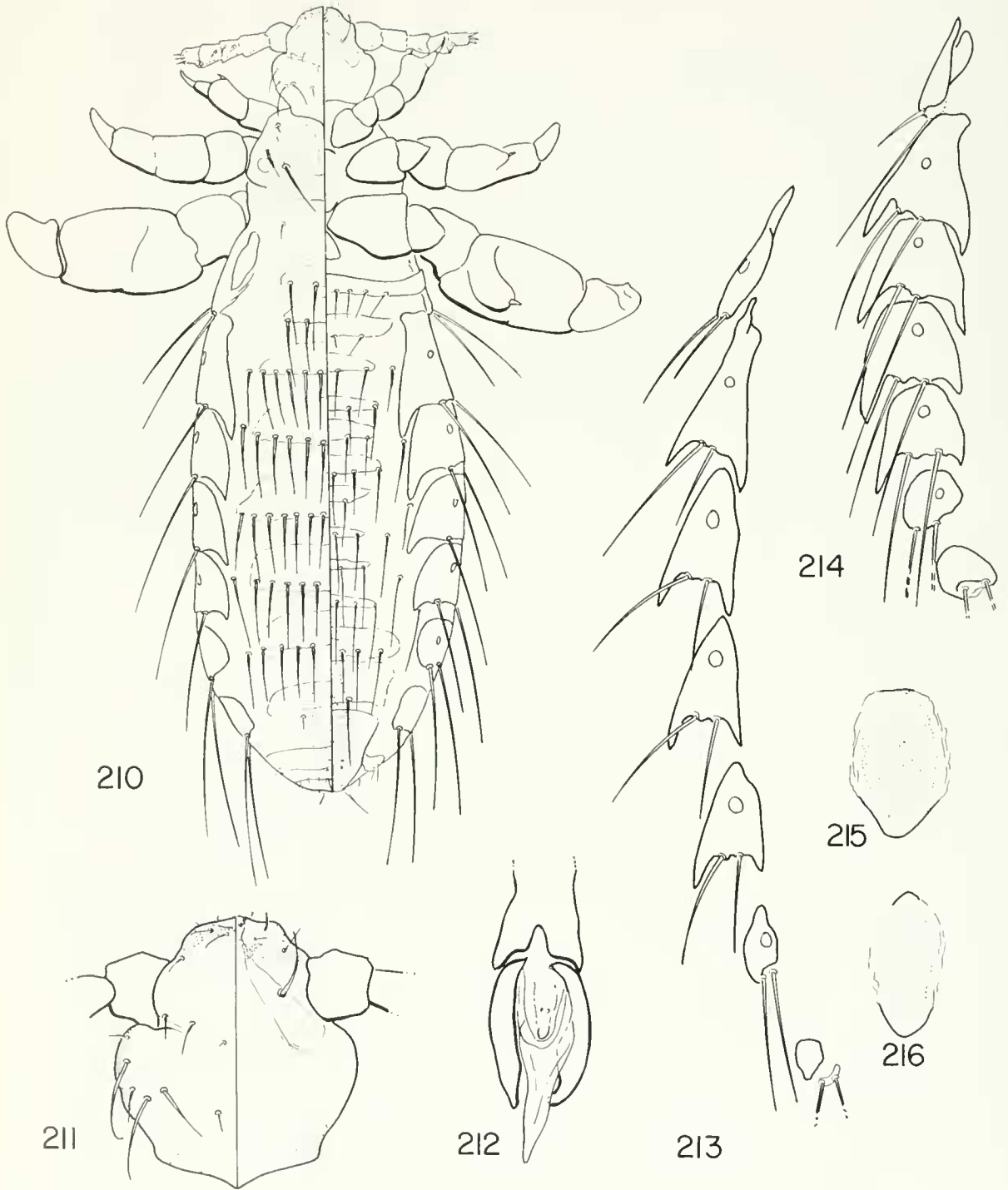


Fig. 210-216. *Hoplopleura* species. 210, *H. orinocoi*, new species, holotype; 211, same, head; 212, same, aedeagus; 213, *H. inusitata*, new species, paratergal plates, allotype; 214, *H. orinocoi*, paratergal plates, holotype; 215 same, thoracic sternal plate; 216, *H. inusitata* thoracic sternal plate, allotype.

Genus *Fahrenholzia* Kellogg and Ferris

*Fahrenholzia* Kellogg and Ferris, 1915a:32.—  
Ferris, 1922:158.—Ferris, 1951:173.—Stojanovich and Pratt, 1961b:693.—Johnson, 1962:416.

Type Species: *Fahrenholzia pinnata* Kellogg and Ferris (orig. design).

A discussion of the host relationships and geographical distribution of species of *Fahrenholzia* may be found in Stojanovich and Pratt (1961) and Johnson (1962). The latter reference also includes a revised description of the genus. Relationships of this very modified genus are in doubt. Ferris (1951) referred *Fahrenholzia* to the subfamily Polyplacinae of the Hoplopleuridae. All the known species are normal parasites of species of the family Heteromyidae, suborder Sciuromorpha. *Fahrenholzia* is limited to Central America, southwestern North America, and northern South America, where there is 1 species.

*Fahrenholzia schwartzi* Werneck°

*Fahrenholzia schwartzi* Werneck, 1952:70, Fig. 1-6.—Johnson, 1962:418, Fig. 14-17, 31, 38.

The type series was taken from *Heteromys anomalus anomalus*, Venezuela: Aragua, Sierra Maestra, Campamento Rafael Rangel. Johnson (1962) recorded *schwartzi* from *Heteromys anomalus* in Trinidad and Magdalena, Colombia.

## VENEZUELAN RECORDS

There were 121 females, 57 males, and 37 nymphs in 56 collections ex *Heteromys anomalus*, from various localities in Aragua, Barinas, Dto. Federal, Falcon, Miranda, Monagas, Sucre, Trujillo and Zulia. The largest collection contained 9 females, 7 males, and 17 nymphs (SVP 14685), Sucre, 4 km S, 25 km E Carúpano, Manacal, 2-VIII-67. There were also 6 collections containing 5 females, 3 males, and 3 nymphs ex *Zygodontomys brevicauda* from T. F. Amazonas, Falcon, Miranda, and Sucre; 2 collections of 1 female each ex *Proechimys semispinosus*, Falcon and Sucre; and 3 collections of 1 nymph each, ex *Oryzomys albicularis*, Tachira and Dto. Federal.

## DISCUSSION

Adults of this species were figured and described by Johnson (1962). The association of *Heteromys* and *F. schwartzi* is very strong. Only 4 other anopluran species, in 9 collections, were taken from *Heteromys* during the Venezuelan survey. Three collections were of *Hoplopleura nesoryzomydis* Ferris, which is a normal parasite of *Zygodontomys*; and 1 were of *Hoplopleura multilobata* Werneck, which is normally found on *Oryzomys albicularis*. Cross infesta-

tion of the lice of *Heteromys*, *Zygodontomys*, and *O. albicularis* may therefore be a relatively common occurrence.

Genus *Neohaematopinus* Mjöberg

*Neohaematopinus* Mjöberg, 1910:160.—Ferris, 1923:237.—Ferris, 1951:185.

Type Species: *Haematopinus sciuropteri* Osborn (orig. design).

A full synonymy of *Neohaematopinus* may be found in the two papers by Ferris. There is only 1 species of this genus known to occur in South America, *N. semifasciatus* Ferris, *sensu lato*, discussed in this paper. Werneck (1948b) described as *Neohaematopinus longus*, a species from the hystricomorph rodent, *Abrocoma cinerea*, Peru. However, Ferris (1951) removed *longus* to the genus *Polyplax*. I have not seen specimens of *longus* but consider it likely that it is more closely related to *Hoplopleura* and/or "Eulinognathus-like" forms than to either *Neohaematopinus* or *Polyplax*.

*Neohaematopinus semifasciatus* Ferris, *sensu lato*°  
(Fig. 2)

*Neohaematopinus antennatus semifasciatus* Ferris, 1916a:100.

*Neohaematopinus sciurinus*, Ferris, 1923:244 (*partim*, sinks *semifasciatus*).

*Neohaematopinus semifasciatus*, Johnson, 1959:586, Fig. 32.

*Neohaematopinus "sciurinus group"*, Wenzel and Johnson, 1966:275.

The types of *N. semifasciatus* were from *Tamiasciurus douglasii*, USA: California, Yosemite National Park. This species also occurs on North American *Tamiasciurus hudsonicus*.

## VENEZUELAN RECORDS

Two females and 1 male ex *Sciurus gilvicularis* (SVP 17776), T. F. Amazonas, 108 km SSE Esmeralda, Río Mavaca; 5 females, 8 males, 2 nymphs ex *Sciurus gratusensis* (SVP 33246, 33274, 33365, 33478, 34256, 34263), Barinas, Altamira.

## DISCUSSION

Members of the "sciurinus group" of *Neohaematopinus* were discussed by Johnson (1959). The only reliable differences found amongst the species were in shape and setation of the antennae. The Venezuelan specimens are assigned to *N. semifasciatus* Ferris because, like that species, the first antennal segment bears a large, spinelike seta on a marked postero-

apical projection, and the second segment has a thornlike seta on its posterior margin (Fig. 2). Ferris (1923) listed a series of specimens of *Neohaematopinus* "sciurinus" from various squirrels from Mexico, Costa Rica, and Venezuela. Some of these may be *semifasciatus*, *sensu lato*. The "sciurinus group" specimens discussed by Wenzel and Johnson (1966), from Panamanian *Sciurus granatensis* and *S. variegatoides*, are morphologically indistinguishable from the Venezuelan series.

In the Venezuelan series, *N. semifasciatus*, *sensu lato*, occurred together with *Hoplopleura sciuricola* Ferris in 3 collections, and with *H. sciuricola* and *Enderleinellus venezuelae* Ferris in 2 collections (from *Sciurus granatensis*).

### Genus *Polyplax* Enderlein

*Polyplax* Enderlein, 1904:142, 233.—Ferris, 1923:183.—Ferris, 1951:199.—Johnson, 1960:48.

Type Species: *Pediculus spinulosus* Burmeister (orig. design.)

Complete synonymies and discussions of *Polyplax* may be found in the papers listed above. There is but one true *Polyplax* species in South America: *Polyplax spinulosa* (Burmeister), on introduced *Rattus* species. A sec-

ond species, *longus* Werneck, has been attributed by Ferris (1951) to *Polyplax*. However, its affinities to this genus are doubtful (see discussion under genus *Neohaematopinus*).

### *Polyplax spinulosa* (Burmeister)<sup>o</sup>

*Pediculus spinulosus* Burmeister, 1839, no. 8.

*Polyplax spinulosa*, Ferris, 1923:187.—Ferris, 1951:211.

Information on the distribution of this cosmopolitan species, originally described from specimens collected off European *Rattus norvegicus*, may be found in the Ferris papers.

### VENEZUELAN RECORDS

There were 11 collections, including 27 females, 43 males, and 4 nymphs, ex *Rattus rattus*, from coastal or near coastal localities in Trujillo, Merida, Dto. Federal, Sucre, and Nueva Esparta. From *Proechimys semispinosus* there was one collection of 1 female and 1 male, Yaracuy and Carabobo, Urama; and ex *Oryzomys minutus*, 1 male, Merida, Paramito.

*Hoplopleura pacifica* Ewing (native to *Rattus exulans* but often found on *Rattus rattus* in tropical and subtropical regions, as well as in the southern United States) was not taken during the Venezuelan survey.

## HOST-PARASITE LIST

In the following list, parasite names enclosed in square brackets represent infestations that possibly are normal, but are not common. Obvious accidental infestations or records based on questionable data are not included. The

group to which each of the species of *Hoplopleura* belongs is indicated as follows: *E. erratica* group; A-F, *affinis-hesperomydis* complex; T, *travassosi* group; Q, *quadridentata* group; A-A, *alata* group; D, *disgrega* group.

Order: Rodentia

Suborder: Sciuromorpha

Family: Sciuridae

*Sciurus igniventris*.—

*S. granatensis*.—

*S. granatensis nesaeus*.—

*S. gilvularis*

Family: Heteromyidae

*Heteromys anomalous*.—

Suborder: Myomorpha

*Hoplopleura sciuricola* Ferris (E)

*Enderleinellus venezuelae* Ferris

*Hoplopleura sciuricola* Ferris (E)

*Neohaematopinus semifasciatus*  
Ferris, *sensu lato*

*Enderleinellus insularis* Werneck

*Neohaematopinus semifasciatus*  
Ferris, *sensu lato*

*Fahrenholzia schwartzi* Werneck

[*Hoplopleura nesoryzomydis* Ferris (Q)]

[*Hoplopleura multilobata* Werneck (Q)]



Family: Cricetidae, Subfamily: Cricetinae

*Oryzomys (Oryzomys) albigularis*.—*O. (Oryzomys) capito* (Brazil).—*O. (Oecomys) concolor*.—*O. (Oligoryzomys) fulvescens*.—*O. (Microryzomys) minutus*.—*Neacomys tenuipes*.—*Nectomys squamipes*.—*N. alfari*.—*Rhipidomys venustus*.—*R. venezuelae*.—*R. macconnelli*.—*R. goodfellowi*.—*R. couesi*.—*R. caucensis*.—*Thomasomys laniger*.—*T. lugens*.—*Akodon bogotensis*.—*A. urichi*.—*Zygodontomys brevicauda*.—*Holochilus brasiliensis*.—*Sigmodon hispidus*.—*Anotomys trichotis*.—*Hoplopleura multilobata* Werneck (Q)  
[*Fahrenholzia schwartzi* Werneck]*Hoplopleura brasiliensis* Werneck (T)*Hoplopleura travassosi* Werneck (T)*Hoplopleura travassosi* Werneck (T)*Hoplopleura rimae*, new species (T)*Hoplopleura hambleyi*, new species (T)*Hoplopleura quadridentata* (Neumann)*Hoplopleura oryzomydis* Pratt and Lane (Q)*Hoplopleura angulata* Ferris (T)*Hoplopleura angulata* Ferris (T)*Hoplopleura angulata* Ferris (T)*Hoplopleura angulata* Ferris (T)*Hoplopleura angulata* Ferris (T)*Hoplopleura angulata* Ferris (T)*Hoplopleura tiptoni*, new species (T)*Hoplopleura indiscreta*, new species (T)*Hoplopleura abeli*, new species (T)*Hoplopleura aitkeni*, new species (A-F)*Hoplopleura nesoryzomydis* Ferris (Q)[*Fahrenholzia schwartzi* Werneck]*Hoplopleura contigua*, new species (Q)*Hoplopleura arizonensis*

Stojanovich and Pratt (E)

*Hoplopleura eximia*, new species (T)

Family: Muridae

*Rattus rattus*.—*Polyplax spinulosa* (Burmeister)

Suborder: Hystricomorpha

Family: Echimyidae

*Proechimys guyannensis*.—*P. semispinosus*.—*Mesomys hispidus*.—*Echimyus semivillosus*.—*Hoplopleura splendida*, new species (A-A)*Hoplopleura splendida*, new species (A-A)*Hoplopleura orinocoi*, new species (D)*Hoplopleura inusitata*, new species (D)

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